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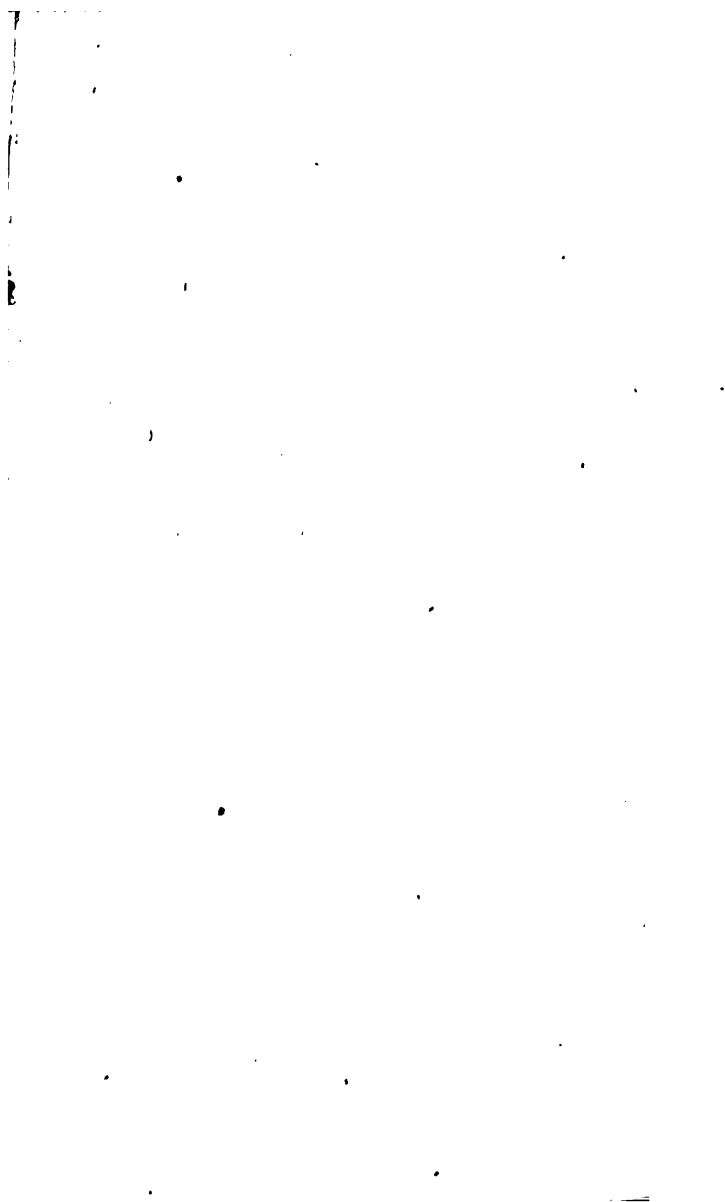


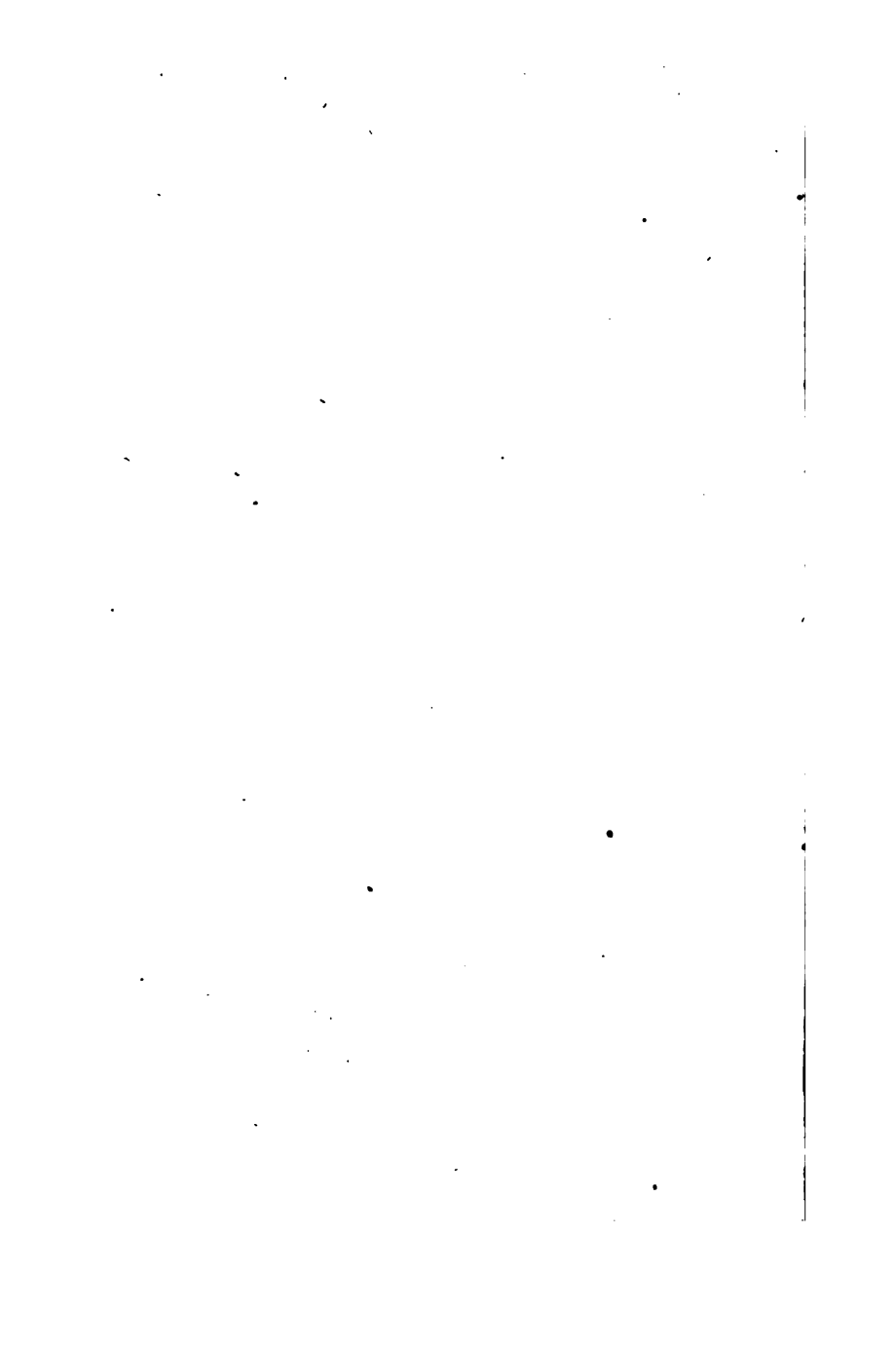
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BERTHA'S
VISIT TO HER UNCLE
IN
ENGLAND.

IN THREE VOLUMES.

VOL. II.

A NEW EDITION.

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BERTHA'S VISIT.

Nov. 17th.—A FRIEND of my uncle's, Colonel Travers, who has lately returned from India, where he served for many years, arrived here yesterday. He has been in various parts of the East, and is so entertaining, that I am sure I shall forget to note down half the curious things which I have heard him mention.

The conversation turned on bees, and he told us that in Mysore, where he was for a long time stationed, he saw four different kinds. That which makes the finest honey is a beautiful little bee of a very small size, and which does not sting. It is called the *cadi*. It forms its combs round the branches of trees; the honey is excellent, and can be procured with very little trouble, as the bees are easily driven off with a switch. But the bee from which the greatest quantity of honey is procured, is large and fierce, and builds under projecting ledges of rock, or in caverns. The honey is gathered twice a year, for which purpose the people kindle a fire at

the foot of the rock, and throw into it the leaves of a species of *cassia*, which emit a smoke so acrid that nothing can endure it—even the bees are forced to retire. As soon as the smoke subsides, a man is quickly lowered by a rope from the top of the rock; he knocks off the nest, and is immediately drawn up again, for were he to make any delay, the bees would return, and their stinging is so dreadful as to endanger life.

In a tour which Colonel Travers made through a part of Ceylon, he found a species of bees which might at first be mistaken for black flies. Their heads, compared with their bodies, are extremely large. The honey is very liquid, and has a disagreeable flavour. I asked him if he had ever seen the honey-bird or Indicator, when he was at the Cape?—he did see it,—and heard its shrill note of *cherr, cherr*, which announces the discovery of a bees' nest. He followed this sagacious bird along with a party of bee-hunters, and it soon pointed out a bees' nest, by redoubling the frequency of its cries, and by hovering over the place. Having taken most of the honey, they left only a small portion for their little guide, so that not having enough to satisfy him, he immediately flew off to find more. These birds construct very singular nests: they are composed of slender filaments of bark, woven together in the form of a

bottle; the neck and opening hang downwards, and a string is loosely fastened across the opening on which they perch.

Colonel Travers told us that the skin of these birds is so extremely thick, that it can scarcely be pierced by a pin; and the bees therefore attack them by endeavouring to sting their eyes.

18th.—Colonel Travers was describing to-day the araca or betel-nut palm. The berry of this tree is, you know, constantly used by the Indians, who chew it both green and dry.

~ The preservation of the fruit during the rainy season, and the cutting it down when ripe, require much expertness and agility. He says, that from the middle of winter to the middle of spring, the leaves fall off: each leaf is attached to a broad leathern petiole or leaf-stalk; and these membranes, which are about three feet long, and half that breadth, are preserved for the rainy season as covers for the young bunches of fruit. This business is performed by a particular set of people; for the stem of the tree, which is about fifty feet high, straight, smooth, and without branches, like most of the palm tribe, is very difficult to ascend. Round his ankles, and under the soles of his feet, the climber fixes a rope; his feet thus bound together, he places against the stem, and while he holds on steadily with his hands, he gently draws up his

feet. He thus moves one hand forward and then the other hand, and afterwards again draws up his feet. In this manner he slowly reaches the top of the tree, where he makes fast a rope, the end of it being tied to the middle of a short stick on which he seats himself and performs his work; drawing up whatever he wants from below, by means of a line hanging from his girdle. When he has covered all the fruit, he unties his seat, secures it round his neck, and swings the tree backwards and forwards, till he can reach another tree, upon which he throws himself, and again makes fast his seat. In this way he swings from tree to tree, and covers or cuts the fruit in the whole garden without once descending to the ground.

19th.—I hear such quantities of amusing things from this East Indian friend of my uncle's, that I scarcely know how to select from them. I wish you were here to listen to his adventures and to see his beautiful drawings. He lent me a sketch of the famous talipot tree of Ceylon, which I have been trying to copy. What a magnificent object it appears, crowned at the top by those immense leaves, one of which, it is said, can shelter fifteen or twenty men from the rain! They seem to be formed purposely for this use, for they fold up like a fan, so that the whole leaf, or any portion of it, becomes portable; and

though tough and impenetrable to water, they are easily cut with a knife. When a leaf is spread out, it is nearly circular; but it is cut for use into triangular pieces, one of which every Singhalese soldier carries as his parasol or umbrella by day, and his tent at night. The fruit is not eaten; but the pith, like that of the sago tree, is very good, if the tree be cut down before the seed ripens; when beaten in a mortar, it produces a kind of flour, from which cakes are made, that taste something like wheaten bread.

Colonel Travers made an excursion into the interior of Ceylon, and he described to us to-day a very curious mode of hunting which they have there. Near the side of a large pond, a hole is dug four feet deep, and wide enough to contain two or three persons. It is covered with leaves, branches, and earth, except a small opening, through which the hunters can keep a look-out, and when necessary point their guns. Before dark, they conceal themselves there, in order to watch the wild beasts, which come from the woods to drink, and the different species of which always come in separate herds. The elephants come first, and stay longest, as they usually bathe before they drink, and when the water is not deep enough, they draw it up into their trunks, and refresh themselves by spouting it over their bodies. The buffaloes come next; after having satisfied their thirst, they amuse

themselves by lying down in the water, and playing and tumbling about. The tigers and the bears also take their separate turns, and towards morning, the wild boars and deer, and other smaller beasts. It is for these that the hunters generally adopt this plan, which, however, is exposed to more dangers than one, for there are instances of elephants falling into the pits and crushing the people; and even of tigers and buffaloes having discovered them by their scent. To avoid such misfortunes, the hunters go in parties, and one person is placed in some secure position, to warn the others, and to frighten away the straggling animals that come too near, by firing upon them, or throwing rockets. Colonel Travers and his companions joined a party of this kind, and here is his history of it.

‘We were called at two o’clock, and having carefully loaded our pieces, and filled our pouches with cartridges, we slowly advanced along the river. At a distance on the other side, the noise of various animals was echoed deep and terrible through the forest; and we heard in almost every watery place around us, rustling and motion. We pitched upon one of the largest of these places, and crept softly, but at a little distance from each other into the bushes and thorns with which it was surrounded. This pool seemed to be about five or six hundred yards

in circumference, and we all agreed not to fire at an elephant, or at any of the large, fierce beasts; but to wait patiently the arrival of the smaller animals.

‘ We had not been long concealed in our thorny hiding place, when two tigers approached at the opposite side, and we observed that they drank one after the other, though there was sufficient space for both. Another half hour elapsed before any thing more made its appearance, but the noise increased on all sides, and made us rather uneasy. At last we heard the deep low of approaching buffaloes, and three soon made their appearance. After having drunk for a long time, they waded into the deep part and lay down, so that nothing could be seen but their noses; and no one, who had not seen them go in, could have suspected that such huge animals were concealed there. In a short time a fourth buffalo arrived, and after snuffing round him for some moments, he began to drink. Though the others put their heads out of the water, they did not interfere with him while drinking; but when he appeared inclined to advance farther into the water, one of them instantly attacked him with a hideous roar, and as the moon shone very brightly, I could see distinctly the whole of their furious battle. At every charge they retired some steps backwards, making the sand fly in clouds, and then, with

dreadful snortings, and at full speed, again rushed upon each other. At last the intruding buffalo received such a tremendous blow, that he fled; and the conqueror, disdaining to pursue him, merely bellowed twice, with a clear and terrific sound, that re-echoed on every side, when he quietly returned to his companions.

'The pleasure I had felt in beholding this furious combat was soon changed into alarm, by the unexpected report of a gun! The three buffaloes started suddenly from the water—for a few moments they stood together snorting with rage, and then two of them rushed off in the direction of the flash, while the third came out near me, as if to search the bushes on all sides. I endeavoured to get out of my bush before the monster could approach; but unfortunately I became entangled in the thorns, and it was impossible to extricate myself in time. By a violent effort, however, I tore myself loose, leaving most of my clothes behind, and instantly began to run—but the furious beast was now close—I almost felt his breath, and looking round saw him not six paces distant, when throwing myself flat on the ground, he passed over me, and continued at full speed! I again crept into the thicket, and in a few minutes I heard the voices of my companions, who were in search of me, armed with flaming pieces of wood. I had felt much incensed against them for firing—but I

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found that they had not been to blame, a branch had struck the lock of one of their guns, which went off, and they had been exposed to as much danger as myself.'

20th.—' And he hardened Pharaoh's heart, that he hearkened not unto them, as the Lord had said.' * My uncle told us to-day that this passage should be expressed thus:—' And the heart of Pharaoh *was hardened*, so that he hearkened not unto them; as the Lord had *foretold*.' It is so rendered, he says, in the ancient versions; and the most judicious modern commentators agree that this is the proper meaning.

' Indeed,' said my uncle, ' in allowing it to be inferred that the Lord had purposely hardened Pharaoh's heart, the translators of the Bible have acted inconsistently with their own view of the phrase in several other places †. This is very striking in the following chapter, where it is said, " Pharaoh hardened his heart at this time also," which plainly implies that his resistance after the former plagues had proceeded from his own perverse and stubborn disposition. I have likewise been assured by some very learned men, that, according to the Hebrew idiom, verbs active often signify *permission*; and in these

* Exodus vii. 13. † Exod. vii. 22, viii. 19 & 32, ix. 7.

verses it is much more consonant to our ideas of divine justice so to understand the expression : that is, that God permitted Pharaoh to proceed in his own proud and wicked career, insensible to the threatened judgments, which he had already despised.

‘ But even supposing that the verb is to be taken in the active sense, it is a remarkable fact, that the event was constantly suspended in order that Pharaoh might have it in his power to relent and to “ set his heart,” that is, to humble and change it, and become obedient to the word of the Lord ; for after five plagues had already been wrought upon him, and that he still persisted, even then his punishment was withheld, in order to let him repent, if he would, Besides which, the delay afforded a far more conspicuous testimony of God’s patience, and gave greater dignity to his wrath.

‘ Pharaoh’s final obduracy therefore was not caused by God’s will, but was the effect of his own previous obstinacy ;—that he hardened his heart was his sin ;—that the Lord permitted him to harden it was his punishment.’

My uncle said also, that a Hebrew scholar told him, that the word which is translated by the verb to *harden* in the above text is, in other parts of the Bible, translated, to *grieve* or to *trouble* ; and that, in his opinion, the construction of the sentence requires one of those words.

'In several parts of the English Bible,' continued my uncle, '*shall* is put in the place of *will*. For instance, in Exodus ix. 4, "And the Lord shall sever between the cattle," where the sense evidently requires *will*; and thus, ch. vii. 4, and ix. 9, "Pharaoh shall not hearken unto you," should undoubtedly be rendered "Pharaoh *will* not hearken unto you." This agrees exactly with the principle I have already mentioned, that verbs active sometimes signify permission.'

My uncle mentioned several other instances of this confusion between *shall*, which seems to ordain, and *will*, which only foretels. And he added, 'There are several of these minor faults and mistakes in our translation, which make it very important that we should never judge of detached passages, but that we should compare different parts of the Bible together, in order that they may throw light upon each other.'

21st.—I forgot to tell you in the right part of my journal, that in preparing my carnation beds, the gardener observed a great number of those wire-worms, which are so destructive to all the pink tribe. I recollected that Mr. Biggs said that salt destroyed them, but that it was difficult to apply just the right proportion; that is, enough to kill the worms, but not enough to render the ground sterile—which a great quan-

tity of salt certainly does. In talking of this to my uncle, it occurred to him that the stuff called salt dross, which is often thrown away, would be a mild form of applying salt; and he was so kind and indulgent, that he procured, not without much trouble and difficulty, a boat-load; it is of an odd purplish brown colour, and retains many saline particles.

To each of my intended carnation beds, which are about six feet long, and two feet broad, we put a wheelbarrow-full of this stuff, which the gardener dug in, and thoroughly mixed with the earth. The beds were then thrown up in high ridges, to remain so for the winter, during which the salt will, my uncle thinks, destroy these mischievous worms, as well as the snail eggs.

If this succeeds, it will be a very satisfactory experiment, but many months must pass before we can ascertain its success.

This was done a few days before my uncle went to town.

22nd.—I have had another walk with my uncle to-day, in the beech-walk, of which he has made me so fond. I took that opportunity of asking him why some trees lose their leaves in winter, and others preserve them; for the fall of the leaf has been a subject of great curiosity to me, and I felt quite sure that he could explain the cause clearly. But he told me that it has

never been satisfactorily accounted for, and that there is some objection to every opinion yet published. He says it would be a very good pursuit for my cousins and myself, to begin a course of observations on the nature of leaves and leaf-buds, and their connexion with the stem; and he has offered a prize, as he says they do in the learned societies, to whichever amongst us takes the best view of the subject.

I asked, was it not caused by frost? 'It is not always the effect of autumnal frost,' he replied. 'Some trees seem to lose their leaves at stated times, independently of the temperature. They fall from the lime, for instance, before any frost happens; and indeed all deciduous leaves, as the season advances, become gradually more rigid, less juicy, lose their down, and at last change their healthy green colour to a yellow or reddish hue.'

He then asked me if I had observed anything of the order in which the different trees cast them. I answered that the walnut and horse-chestnut appeared to have lost their leaves before any other: then the sycamore and lime, and I believed the ash had soon followed; but that many of the elm, and most of the beech and oak trees were still well covered, though they had changed colour.

'Yes,' said he, 'but the leaves of the young beech, though they have become brown and dry,

will not fall till spring; and the fibres of the oak are so tough, that the leaf does not easily separate from the branch. You may also perceive that the apple and peach trees remain green, very often till the beginning of December. Some botanists attribute the defoliation of trees to the drying up of the vessels which connect the leaf with the stem; and others to the swelling of the young buds for the succeeding year. This, they say, deprives the old leaf of its accustomed supply of sap, and as they enlarge, they push it out of their way; but there is a material objection to this theory, that the leaflets of *pinnated* leaves fall in the same manner, though there are no buds to push them off.

'It is also supposed that the vessels of the petiole gradually become woody, and incapable of freely transmitting the sap; it therefore stagnates, the vessels become overloaded, and the parts which connect the stem and the leaf crack at the insertion of the petiole. The vessels being thus interrupted, the leaf is no longer supplied with proper nourishment; it loses its elasticity, and becomes dry and brittle; and the least shock, whether the effect of frost or of wind, detaches it.

'Another opinion,' added my uncle, 'is, that the fibres of the leaf-stalk are not a simple continuation of those of the twig or branch, but that they both terminate at that point from which the

leaf falls ; being only connected by a kind of adhesive substance, which dries up when the sap ceases to rise. This point of separation you may easily perceive,' said he, 'like a cicatrice, in the form of a ring ; and the same appearance of a natural separation is to be seen in the peduncles of flowers, which seem also to be attached by a sort of vegetable solder to the stem.'

'But, uncle, why then do not leaves fall much sooner, if they are so slightly attached to the stem ?'

'Because this adhesive substance is a strong cement, as long as it is supplied by the vegetable juices. If you attempt to remove the stalk elsewhere than at that point where it is united, the fibres are lacerated, and this proves that the separation had been prepared for at that one point, by some peculiar organization which acts independently of frost or rain, or other external causes.'

My uncle then showed me the ring which marks the point of separation. It is most easily seen in autumn, he says ; it is double in the orange, and in the hawberry he showed me that it is above the point of contact between the leaf and branch, so that after the fall of the leaf, the rudiment of the foot-stalk remains to preserve the bud. He took the trouble of pointing out a little triangle of thorns behind the young bud, which seems to be another beautiful contrivance

of nature for its protection in that bush. We then observed this point of separation in other trees whose leaves were not at all gone, and he told me that it is very strongly marked in the horse-chesnut with five small dots.

I begged my uncle to tell me what I should particularly pay attention to in the course of our observations.

He said that as it has never yet been ascertained whether the leaves spring from the wood or from the bark, he would advise us not merely to observe the progress of the buds, but to take every means of tracing their connexion with the interior. We may examine with his microscope all sorts of twigs, to see whether the vessels of the central part of the wood extend to the leaf-stalk; and he suggests that we should very carefully observe the difference of structure in evergreen leaves, and in those which perish in the autumn. He recommends us to lose no further time in beginning our task on the few remaining leaves, in order that we may see in spring whether evergreens shed their leaves in the same manner; and we are also to ascertain when their buds are actually formed. 'Above all,' he says, 'I advise you to take nothing for granted—examine every thing with your own eyes, and learn facts.'

I shall like this employment very much, and Mary, Frederick, and myself have agreed to work

in concert. Both my uncle and aunt encourage us ; they say it will afford an opportunity for very entertaining experiments, and they think that inquiries of this sort are highly useful to young people.

23rd.—The fields which were ploughed and sown with wheat not above two months ago, are now of a beautiful green ; how hardy it must be, to withstand the severe weather, which I am told may soon be expected ! My uncle says, that wheat grows in every variety of climate, except in regions of extreme cold.

It has not been ascertained of what country wheat was a native, and it is certainly a very remarkable fact, that, though cultivated so generally, no wild plants of those species that are used in agriculture have been found, though one of our late travellers imagined that he found it in the mountains of Thibet.

The ploughs are still at work preparing the ground for oats to be sown in spring ; or they are laying it up in fallows. The potatoes have all been dug long ago, and safely packed in houses, to preserve them from the frost, which spoils them. My uncle says, that though potatoes are more used than formerly, they are not such a general article of food as in Ireland. The custom there is to store them in pits covered with a high mound of clay, which by excluding the

air, delays the progress of vegetation in the root, until the time of replanting returns.

‘It is quite astonishing,’ my aunt remarked last night, ‘how the cultivation of potatoes has spread since they were first discovered in South America, and imported by the Spaniards, who called them *papas*. Sir Walter Raleigh found them afterwards in Virginia; he introduced them into this country in 1596, and there is now scarcely a civilized spot on the earth to which we have not distributed them. Even to Persia, this valuable root has been conveyed by the benevolent exertions of our envoy, Sir John Malcolm; and at Abusheher the grateful inhabitants call it Malcolm’s plum.’

I have been very busy this morning clearing away all dead stalks and leaves in my garden, and completing the borders, which I have edged with thrift; and all my seed-beds have been lightly covered to preserve them from the expected frost.

The gardener is going to try two new methods of raising pine-apples; for my uncle always likes to ascertain truth by experiment. A great pit is to be filled with withered leaves, which in decaying undergo a fermentation that produces sufficient heat to answer the purpose; and in this pit the pots of pine plants are to be plunged. The second method is to place the pine-pots on a brick stand, in a moderate heat, and without

being plunged in either tan or leaves. He is a most valuable gardener, and finds time for many nice little experiments, without ever neglecting his regular work. All his carrot, parsnip, and beet roots are taken up, and preserved in dry sand; he is now sowing celery under glass frames, for an early crop for next year; and Mary says they have had celery every day since July, in continual succession, as he constantly earthed it up, adding still to the height of the earthing, in order to increase its size and whiteness. His peas and beans he sowed three weeks ago, in the warm border in front of the south fruit-wall. He is now going to protect them from frost by branches of fir-trees, and he hopes to have some ready for the table by the second week in May.

What a contrast there is between the labour and attention necessary here for all these vegetable productions, and the luxuriance with which they spring up in Brazil! But there is a pleasure, I am sure, in successful industry, that is scarcely understood by the indolent inhabitants of those warm and fertile climates.

25th.—Yesterday, being a bright lovely day, my uncle and aunt took advantage of it to go to Newnham to see the poor travellers, of whom we had heard nothing for some time.

Beyond all our hopes, they found Bertram

considerably better. My aunt had requested her own physician to attend him, and he is now so much recovered, that if the weather continue mild, he is to set out to-morrow on his way home. The old gentleman arrived last week ; and though great agitation was caused at first by their meeting, yet it seemed to have a favorable effect on Bertram, as the anxiety and fear of never seeing his poor old father again had preyed on his mind.

Madeleine's spirits are a little improved ; she allows herself once more to hope, but she is prepared to submit with true Christian resignation to whatever happens. She is relieved too from all anxiety in regard to her new father ; he received her as a daughter, and expresses the greatest tenderness for her and her pretty little child ; who has learned to say ' dear grandpapa ' among the few English words she has picked up.

When my aunt went in, she found him just going to read prayers to his son ; she begged of him to go on ; and she says nothing could be more touching than the scene—the weak but solemn voice of the pious old man ; the calmness and devotion in the countenance of the son, and the gleam of hope that shone over Madeleine's subdued and sad countenance.

26th.—Now that winter has really begun, we make a circle round the fire after dinner ; and

we are so comfortable and happy there, that I am often sorry when the time comes for leaving the room.

We have various amusements; on some days we each invent little tales, which are to turn on some circumstance that is first agreed upon; at other times, we have some of those question plays, in which you discover, by a particular set of questions, the thoughts of another person. One of our favourite occupations is doing arithmetical questions in our heads. We have often used a multiplier of three or four figures, which, I assure you, makes it hard work. My uncle and aunt now and then join in this; and being of course very ambitious to outdo them, we all get into a sort of fever of exertion, which makes it very diverting, and the conqueror very triumphant.—Then we compare the different methods which we took, and each person finds out what caused their mistakes. I am afraid I am oftener behind in the race than most of the party; for beside their being much better arithmeticians than I am, I am so afraid of being wrong, that I do not speak out in time, even when I have my answer ready and right.

I must tell you one of the questions we had this evening; it was proposed by Caroline. In one of the vignettes to Bewick's birds, there is a man preparing to fasten himself to a team of

birds, which are to convey him to the moon; the team is wedge-shaped, and the birds are harnessed together in rows, each of which increases by one, from the single bird that acts as leader. Now, supposing that the man weighs ten stone, and that each bird can raise five pounds, how many rows of birds are necessary for his flight?

27th, Sunday.—My uncle again took up the judgments inflicted on the Egyptians. He said, that if they were considered with reference to that particular nation, it appeared that there was a peculiar meaning in some of those calamities, which would not have applied so well to any other people. He told us that they paid an idolatrous reverence to many of the inferior animals, and worshipped, as superior gods, the ox, the cow, and the ram. Among these, the Apis and Mnevis are well known; the former, a sacred bull, adored at Memphis, and the latter at Heliopolis. There were also a cow and heifer, which had similar honours at Momemphis. These judgments were therefore very significant in their execution and object: as the Egyptians not only saw their cattle perish, but, what was still more dreadful, they saw their deities sink before the 'God of the Hebrews.' This satisfactorily explains what is said in Num-

bers : ' Upon their gods also the Lord executed judgments ;' * and these events had doubtless a useful influence, though not a lasting one, on the minds of the Israelites, to whom the gods of the Egyptians must at that time have appeared very contemptible.

' I will cause it to rain a very grievous hail : ' this judgment, he told us, was also particularly adapted to the Egyptians. The rain and hail that were foretold must have appeared, of all things, most incredible to the Egyptians ; for in Egypt little or no rain ever falls, the want of it being supplied by dews and by the overflowing of the Nile ; and when they witnessed this storm of hail, ' such as had not been in Egypt since the foundation thereof,' and accompanied by ' mighty thunderings,' and fire that ran along the ground, what dread and amazement they must have felt ! Pharaoh had received warning of these terrific prodigies, which the deities of Egypt could not avert ; and even the fire and water, which had been held sacred by the Egyptians, were now employed, they found, as passive instruments of their punishment. Besides the formation of the hail, which was so uncommon in that country, its falling so miraculously on the day and in the district foretold, must have overwhelmingly convinced

* Numbers xxxiii. 4.

them of the impotence of the creatures which they worshipped, and of the boundless power of the Almighty.

I asked my uncle at what season these plagues had happened, and why the injury to flax and barley were particularly mentioned.

'The season,' said he, 'is not expressly stated; but as the departure of the Israelites was on the 15th of the month of Abib, which corresponds with the beginning of April, we may suppose that the seventh plague (of hail) was sent about the beginning of March, so as to leave time for the three succeeding plagues. This idea is confirmed by travellers, from whom we learn that the barley harvest in Egypt is reaped in March, and the wheat in April; and it explains why "the barley was in ear," though not yet fit for reaping; and "the wheat and the rye were not grown up." Abib means the month of the young ears of corn.

'Their barley must have been a grievous loss, as the principal beverage of the Egyptians was made from it; but scarcely any thing could have distressed them more than the loss of their flax, because the whole nation wore linen garments, and the priests never put on any other kind of clothing. This linen was manufactured from that fine flax for which the valley of the Nile was famous, and was in great request in other countries also; for though the Egyptians

did not trade abroad themselves, yet they readily disposed of it to foreign merchants.

28th.—A question of mine, this morning, though it exposed my ignorance, gave me an opportunity of perceiving how much light is thrown by general knowledge on the difficult parts of Scripture history; and, indeed, on all other history. I had asked how it was that the locusts, independently of their coming at the appointed moment, could have been called one of the miraculous plagues, as they were so common in Egypt. I saw my cousins looking a little surprised, but they are so good-natured that they never laugh at my mistakes.

My uncle explained to me that I was wrong in supposing that locusts were common in Egypt. 'They are very abundant,' he said, 'in the neighbouring regions of Arabia, which has been proverbially called their cradle, but the Red Sea appears to be an effectual barrier against their molesting the Egyptians. They seldom succeed in crossing any great extent of water; for though they frequently migrate into very distant countries, yet their habit of often alighting on the ground is fatal to them in traversing the sea.

'There is another circumstance that saves Egypt from the visits of these dreadful insects: when they take wing they are obliged to follow the course of the wind, and in that country,

you know, the winds blow six months from the *north*, and six months from the *south*; but, at the time spoken of, an east wind prevailed "all day and all night;" and the whole face of the country in the morning was covered with the locusts. This strong easterly wind, which enabled them to cross the Red Sea, was plainly preternatural; and we are told distinctly that "before them there were no such locusts as they, neither after them shall be such."

'There are in Scripture ten names for locusts. The species mentioned here, is called *Arbah*, which imports multiplicity; a very just name, indeed—for their prodigious numbers almost defy calculation; and the famous Dutch naturalist *Leuwenhoek* asserts, that every female lays upwards of eighty eggs. When a cloud of these insects alights upon the ground, the devastation they create is dreadful. *Adanson*, in his voyage to the western coast of Africa, says, that they devoured to the very root and bark; and that there was something corrosive in their bite, which prevented the trees from recovering their power of vegetation for some time. They even attacked the dry reeds with which the huts were thatched. Another traveller tells us that in Cyprus, as he went from *Larnica* to a garden at about four miles' distance, the locusts lay above a foot deep on several parts of the high roads, and millions were destroyed by the wheels

of the carriage. Dr. Shaw says, that he saw them in such multitudes in Barbary, in the middle of April, that in the heat of the day, when they formed themselves into large bodies, they appeared like a succession of clouds darkening the sun; in June the new broods made their appearance: on being hatched, they collected together in compact bodies of several hundred yards square; and marching directly forward, climbed over trees, walls, and houses, ate up every plant in their way, and let nothing escape. The inhabitants made trenches and filled them with water; they also placed quantities of combustible matter in rows and set them on fire; but in vain, for the trenches were quickly filled up and the fires extinguished by the vast numbers that succeeded each other.

‘Strong winds, which can alone free a country from this plague, have several times blown large swarms over the central part of Europe, and even to England; and it was a “mighty west wind,” which formerly carried them away from Egypt and cast them into the Red Sea.’ I asked if these insects were really eatable, as St. John is said to have lived on locusts in the wilderness?

‘As it is well known,’ said my uncle, ‘that locusts have in all ages been eaten in the east, and are still esteemed a great delicacy in Barbary, as well as in the south of Africa, some

commentators have endeavoured to prove that St. John did eat them in the wilderness. But the word translated locusts signifies also *Pods* or seed-vessels of trees. The pods of some of the Robinia and Gleditsia tribes are considered in Syria to be sweet and nourishing ; and it is, I believe, generally supposed that they were the food alluded to in the Gospels.

29th.—In our genius conversation to-day, several people were mentioned on each side: Mary quoted a passage from Johnson's *Lives of the Poets*, respecting Denham, who, he says, was 'considered at Oxford as a dreaming young man, given more to cards and dice than to study;—he gave no prognostics of his future eminence, nor was suspected to conceal, under sluggishness and idleness, a genius born to improve the literature of his country.' 'Of Swift, too,' continued Mary, 'there appears no early proof of genius or diligence ; for when at the usual time he claimed a bachelorship of arts, he was found by the examiners too conspicuously deficient for regular admission—and at last obtained his degree by special favour; a term used as Johnson says, in the university of Dublin, to denote want of merit.' It is probable, therefore, that new circumstances combined together afterwards, to *bring out* the powers possessed by these celebrated men ; and

I am sure, Mamma, this little perpetual argument serves to bring out several very entertaining biographical facts.

Haydn, the famous composer, was the son of a wheelwright; such an employment was not likely to lead to the cultivation of music, and we might be tempted to consider him as a natural genius; but it appears that his father played on the harp, and on holidays used to accompany his wife while she sang. Whenever this little domestic concert took place, the child with two pieces of wood in his hands, to represent a violin and a bow, pretended also to accompany his mother's voice; and to the very close of his life, this great musician used to perform with delight the airs which she had then sung. A cousin of theirs, a schoolmaster, came to see them, and being well pleased with the boy's talents, proposed to educate him. His parents accepted the offer; and at school, having discovered a tambourine, an instrument which has but two tones, he succeeded in forming a kind of air, which attracted the attention of all who came to the school-house. He was then taught to sing at the parish desk, and was soon noticed by Reüter, who tried him with a difficult shake, and who was so delighted with the child's execution, that he emptied a plate of cherries into his pocket. He was eight when admitted to the choir of St. Stephen at Vienna, and from that

time practised above sixteen hours a day. 'In all this,' says Mary, 'we see the natural effect of circumstances, and no mark of what is called absolute genius.'

30th.—Colonel Travers was not present at our conversation about the locusts; but on its being alluded to this evening, he told us that he had once seen a flight of those creatures which contained such an incredible multitude; that nothing could have persuaded him of the fact, if he had not been an eye-witness to it himself.

Instead of going by sea to India, he went overland, that is through part of Turkey, Arabia, and Persia; and, in 1811, he happened to be at Smyrna, in Asia Minor, when this extraordinary flight of locusts occurred. He says that for several days stragglers had been passing, but at last the main body came, and in such a dense column, as not indeed to obscure the sun, but to produce a curious quivering light. He thinks the lines in which they appeared to fly were about one foot asunder, and that locust followed locust at the distance of three feet. They came in a steady, undeviating direction from south to north, and continued to pass without any diminution of their numbers, for three successive days and nights. The breadth of this prodigious column was at least forty miles, for a messenger who had been dispatched by the consul to the

pasha of Sardis, passed through them all the way, both going and returning. Caroline immediately produced the map of Asia Minor, and we found that Sardis is fully that distance from Smyrna, and that its direction is just at right angles to the direction of their flight.

My uncle was greatly interested by the Colonel's account of this remarkable swarm, and proposed that we should endeavour to make some estimate of the number of locusts of which it consisted. We all took out our pencils, and went to work. In the first place, the breadth of the column was 40 miles, or 70,400 yards; and as their ranks were a foot apart, we have 211,200 for the number of locusts at each foot of elevation. Colonel T. was then examined as to the entire height; he thinks it must have been much above 300 yards, for, on looking upwards with his pocket telescope, he could see them like little specks glittering in the sun. We contented ourselves with the 300, and taking them also at a foot apart, there were of course 900 locusts in height, by which we multiplied the former number, and the product was 190,080,000. Now, Mamma, for the length of the column: he says there was a gentle breeze from the southward, with which, and their own velocity, he thinks that they were travelling at the rate of about seven miles in an hour, and that they succeeded each other at an average distance of three feet.

In each mile, then, there were 1760, and in seven miles, 12,320, which, multiplied by 72, the number of hours in the three days which the flight continued, gives 887,040 for the number in each line of the column; and this, finally multiplied by the 190 millions, gives the almost inconceivable total of 168,608,563,200,000 in this one swarm of locusts!

‘I should like to know,’ said Mary, ‘the exact size of these creatures.’

The Colonel said that he could not answer exactly, without referring to his journals, which were in town, but that he imagined they were about the same size as a large grasshopper: ‘but why do you want their exact dimensions?’

Mary said she would have tried what sized mountain they would have made, if they were all heaped together. Frederick, who is a great collector of grubs and insects, immediately brought down some dried grasshoppers, but they were very small; and after much consultation, it was agreed to assume two inches for the length, and a third of an inch for the breadth and thickness of a locust. In a short time, Mary announced, as the result of her calculation, that the whole quantity would amount to 4818 millions of cubic yards.

‘But in order to compare this huge mass with some tangible standard,’ said my uncle, ‘let us see what proportion it bears to the largest pyra-

mid of Egypt. According to the measurement of Dr. Greaves, the base of the pyramid of Cheops is 693 feet, and its perpendicular altitude is 499 feet.'

We again went to work, and Mary was again first with the answer, that her heap of locusts was 1030 times larger than the pyramid!

'Well, Bertha,' said my aunt, 'you and I will try what sort of a girdle the Colonel's locusts would make for the earth, supposing them to be placed close together; but what shall we assume for its circumference?'

My uncle said we might take 24,800 miles; and with my kind aunt's assistance, I had the pleasure of astonishing the party with the information, that this great swarm of locusts would have encircled the globe with a band of a mile and an eighth wide!

If these locusts had alighted anywhere in a body, I suppose they would have destroyed everything; as it was, Colonel T. says, the stragglers did a great deal of mischief throughout the country, and he mentioned a laughable story of the wife of an English merchant at Smyrna, with whom he was acquainted. This lady was very fond of her garden, and on the approach of the locusts, she and her maids had spread sheets and table-cloths over all her choice flower-beds to protect the plants. Poor woman! she went to bed priding herself on her ingenuity;

but when the morning came, she found all gone—not only the flowers, but the linen also totally demolished.

In answer to a question from my uncle, he said he had not been able to learn whether any great proportion of these locusts had penetrated into Russia and Europe, but he knew that myriads had perished in the sea of Marmora and the Euxine. In the Gulf of Smyrna he had himself seen a ridge of their dead bodies, which was two feet high, and which had been washed up along the whole extent of the beach by the waves. The smell was most noxious, polluting the air for several miles inland; and this, he thinks, may partly account for the plague which occurred in the following spring. There is a saying in that country, but for the truth of which he does not vouch, that, every seven years, Arabia sends a swarm of those destructive insects into Asia Minor, though very rarely of such magnitude as that of 1811; and that every locust-year is succeeded by a plague-year of more or less severity.

Wentworth asked him if he had ever seen locusts used as food; and he replied that they are eaten in a great many parts of the world, and cooked in a great variety of ways. In some countries they are stewed, or fried, or made into soup, or salted and preserved; in others they are ground, mixed up with flour,

and baked into cakes; but he had frequently seen the Arabs eat them without any preparation whatever, merely pulling off the head, wings, and legs.

My uncle and he continued to converse on the subject for some time, and I learned one more fact for you,—that their flight produces a sort of indistinct, tumultuous sound, something like the rustling noise of flames. The Colonel says this noise made his horse very uneasy, which no doubt was greatly increased by the locusts incessantly striking against him. In riding to Bournabat, where the English merchants have country houses, he crossed their line of flight; and in order to save his face, he was obliged to keep his hat on the side of his head, against which they pattered like a shower of hail. It appears that they never turn to the right or to the left, but fly straight forward, as if following one supreme leader, or rather as blindly impelled by some irresistible influence.

‘How truly,’ exclaimed my aunt, ‘it is said of them in the Bible, “The locusts have no king, yet they go forth all of them by bands.”’

Dec. 1st.—Colonel Travers, who every day tells us something curious that he has seen in his travels, has been describing the cultivation of the pepper vine in the East Indies. In July, at the beginning of the rainy season, from eight

to twelve shoots are planted round some tree chosen for their support: as they grow up they must be tied to its stem; and in dry or hot weather they are watered. They begin to bear in six years; in ten, they are in full perfection, and continue so for twenty years more, when they die. When the fruit is intended for *black* pepper, it is not allowed to ripen, but collected while green. As soon as the berries become hard and firm, which happens between the middle of December and the middle of January, they are pinched off by the fingers, placed on a mat, and rubbed by the hands or feet till the seeds, several of which are contained in each berry, are separated. These seeds are then spread on mats; and at night they are collected in earthen jars, to preserve them from the dew. Two or three days' exposure to the sun sufficiently dries them, when they are put up in bags, containing from 60 to 120 pounds, and are then considered fit for sale. When the berries are intended to produce *white* pepper, they are allowed to become perfectly ripe, in which state they are red. They are then well rubbed in a basket, and when the pulp is washed off, the seeds are white, and are immediately dried for sale. The vines, however, in this case are apt to die, and in the province of Malabar but little white pepper is now made.

A good plant produces about 32 pounds; this

is the highest produce; 21 pounds is the average. The *mango* tree is preferred for supporting the pepper vine, as the fruit is not affected by it; but the fruit of the *jack* tree, which is also used for the purpose, is thought to be injured in flavour by the pepper being so near it.

The Colonel says, that the pepper plant is not a vine in reality, though the knotted stem, when dry, has much the appearance of a common grape vine. The leaf, too, is different, being pointed, and with deep veins in it, all meeting at the point.

2nd.—Caroline amused us after dinner with a singular anecdote of a musician of the name of Davy; though she was at first unwilling to relate it, as she could not remember her authority.

He was the son of a Devonshire farmer, and, when a little boy, used to go continually to a neighbouring forge, where he seemed to be strangely interested in examining and sounding the horse-shoes.

After some time, the smith, having frequently missed his shoes, began to suspect young Davy of stealing them; the boy was, therefore, watched, and one day he was observed to have separated two shoes from a parcel which he had been sounding for a long time. He took them up and went quietly off, but was followed, and traced to

a loft, where he had formed a hiding-place for himself, unknown to any of his family. There he was found arranging his newly stolen treasure among a number of other horse-shoes which he had suspended with iron wires, so as to form a sort of musical instrument, on which with a small hammer he could play several tunes; particularly one with variations, which he had often heard chimed in the parish steeple.

The generous blacksmith not only forbore from punishing him, but joined in a subscription, by means of which he was apprenticed to a famous musician.—So much for genius.

4th, Sunday.—My uncle read to us this morning the account in Exodus of the institution of the feast of the Passover. It took place in the beginning of the sacred or ecclesiastical year, in the month named *Abib*, which signifies, he says, an ear of corn; but this month was afterwards called *Nisan*, which means the 'flight,' in allusion to the escape of the Israelites. It was at this same season that our Lord suffered for our redemption; and it is a remarkable circumstance that there was always a tradition among the Jews, that as they were redeemed from Egypt on the 15th day of Nisan, so they should on the same day be redeemed from death by the Messiah.

My uncle then said, 'many of the ceremonial

laws of the Hebrews had a direct reference to the idolatrous opinions and rites of the neighbouring nations. For instance, some of the ordinances of the passover, which was, you know, a memorial of the deliverance of the Israelites, were strikingly in opposition to the most deep-rooted prejudices of the Egyptians. Amongst that people, lambs and kids were held in the utmost veneration, and never sacrificed; but the Israelites were instructed to sacrifice both. The Israelites were desired to "eat no part raw," which might appear a very unnecessary injunction, did we not know that it was usual to do so in the heathen festivals, as we learn from Herodotus and from Plutarch, who both mention it as being customary at the feasts of Bacchus, which had their origin in Egypt. Of the Paschal lamb, "no bone was to be broken;" for on those occasions the heathens broke the bones, and pulled them asunder with frantic enthusiasm. Neither was it to be "sodden," as in their magical rites: but roasted by fire, and not by the heat of the sun, which was one of the chief objects of their idolatry. It was to be eaten along with "the purtenance," that is, the intestines, which the heathens reserved for their impious divinations. Lastly, "no fragments" were suffered to remain, because the superstitious multitude had been in the habit of pre-

serving them for *charms*; and they were, therefore, ordered to be burned.

‘The lamb or kid was to be slain in the evening; the Hebrew expression is literally “*between the two evenings* ;”—for among the Jews there was an early and a later evening; the first beginning at noon, as soon as the sun began to decline, and the second at sunset, which at this season of the year, the vernal equinox, took place at six o’clock. Thus the time “between the two evenings,” when the passover was slain, was about three o’clock in the afternoon; and this was the very time of the day when Christ, the true passover, was sacrificed on the cross.

‘What a striking analogy there is,’ continued my uncle, ‘between that typical sacrifice of the Paschal lamb, and the grand sacrifice of Him who is called “the Lamb of God which taketh away the sins of the world;”—between the deliverance of the Israelites from bondage, and the deliverance of mankind from sin, by a final atonement, which for ever closed all other offerings and sacrifices.’

I asked why we were desired to eat unleavened bread at this feast; and my aunt told us that some authors suppose it was to remind them of the privations and hardships they had formerly endured in Egypt, as it is very heavy and disagreeable. ‘But,’ she added, ‘I have

also understood that, in the ancient figurative mode of expression, *leaven* was the emblem of hypocrisy and artifice ; and therefore that eating the passover with unleavened bread, implied the performance of the ceremony in sincerity and truth. They were commanded to eat it with " their shoes on their feet, and their staff in their hand," or in other words equipped for a journey. It appears to have been, and indeed is still, the universal custom of the inhabitants of the East to put off their shoes during their meals ; not only because that is a period of enjoyment and repose, but because, to people who sit cross-legged on the floor, shoes would be troublesome, and would soil their clothes and their carpets. This solemn meal, on the contrary, which was intended to commemorate their miraculous and abrupt deliverance from Egypt, was to be eaten by the Israelites in the dress and posture of travellers, as if ready for immediate departure.'

My uncle gave us an amusing instance of the punctilious regard that the Jews pay to the letter of the law ; which not only prohibits their eating leavened bread, but their having it at all in the house. In Exodus xiii. 7, it is written, ' Neither shall there be leaven seen with thee in all thy quarters.' On the eve of the pass-over, the master of the family, attended by all his children and servants, formally search every

corner of the house with candles in their hands ; but why with candles ?—because in the prophet Zephaniah, i. 12, it is written, ‘ I will search Jerusalem with candles.’

‘ This feast,’ continued my uncle, ‘ was called the Passover, because the destroying angel of God passed over the Israelites without smiting them ; and to pass over is a literal translation of the Hebrew word *pesach*. From whence also we have the expression of the Paschal Lamb.

‘ The deliverance from Egyptian bondage was a specific type of our subsequent deliverance from the yoke of sin, which we commemorate in the sacrament of the Lord’s supper ; and it is remarkable, that both the Jewish and the Christian rite were enjoined as memorials of events which had not yet happened. To all mankind the privileges of this great second deliverance are offered ; and let us remember that, like the Israelites, we are but strangers and pilgrims here, hastening on to a *land of promise*.’

6th.—Mary asked Colonel Travers, to-day, why rice is called *paddy* in the East Indies. He told us, that the wet lands capable of being cultivated for rice, are called, in the province of Malabar, *padda* land ; and thence has the name paddy been given to the grain before the

husk is beaten off. It is cultivated in all the low grounds which are periodically overflowed, or where the water can be regularly let in. Sometimes it is sown dry, on fields properly ploughed and moistened beforehand, and when the leaf is a certain height, the water is gently let into the furrows; but in many places it is sown very thickly, and afterwards transplanted. The general mode of preparing the seed is to steep it in water, and then to mix it up with earth in a shed, where it heats a little, and soon sprouts; when the shoot is nearly two inches long, it is carried in baskets to the field, and planted in rows.

The operation of cleaning rice is assisted by boiling for a short time; after which, it is beaten in a mortar, with a stick five or six feet long, the bottom of which is shod with iron. But the rice used by the higher class of Brahmins is not boiled, lest it should be in any way defiled: it is every morning cleaned dry by one of the family, the labour of which is very great, because the husk adheres so closely to the grain.

Paddy is often kept in small caves, called hagay, the entrance to each of which is by a very narrow passage. The roof, floor, and sides are lined with clean straw, and the cave is then completely filled.

Colonel Travers is just like my uncle, he is so ready to answer all our troublesome questions;

and you may suppose that some of us ladies asked him about the ottar of roses. He says, that the rose from which that essential oil is made, grows only in the valley of Shiraz, where there are immense fields of it. The flower is small, and of a deep red, and quite a different species from the *rosa indica*. It does not thrive south of Shiraz, as the climate is too hot ; and the plants which have been brought to Bombay have generally failed.

We have had several rainy days, on which it was impossible to walk out ; though it seldom happens, my uncle says, in this climate, that there is not some part of the day quite fair.

The gravel walks here dry quickly ; but nobody seems to care much about wet or dirt, their feet are so well defended from damp ; and my aunt has provided me with all the comfortable preservatives from wet that my cousins have, so I force myself to go out and to take long walks. Sometimes we visit the poor people, to whom a little sympathy and kindness seem to be a great comfort ; and the school is so near the shrubbery, that, unless the rain is very heavy, Caroline contrives to go there every day.

When we are so much confined as we have been for the three last days, we take care to practise well at battledore and shuttlecock ; yesterday evening I kept it up to three hundred. Sometimes four of us play at once without any

confusion ; and sometimes even my uncle joins us. My aunt encourages us to exercise ourselves with active plays ; and if you and Marianne could peep at us, you would be amused at the vigour and emulation with which we perform Puss in the corner, and Friar's ground, or ' turn the blindfold hero round and round.' After luncheon is generally the time for these ' laborious sports.' Grace, of course, delights in them, and my uncle and aunt seem fully to enjoy our glee and gaiety ; for exercise and recreation, they say, should be mixed sufficiently with all our studious employments. You will smile when I confess, that, much as I like them now, I felt at first that these ' romps,' as I called them, were rather too childish ; my aunt told me to do as I liked ; but, as I found that I only appeared conceited by sitting still, I soon conquered these silly feelings.

I have nothing more to say, except that I have begun to read Rollin's Ancient History ; for the purpose of comparing the sacred and profane parts, and because I have some idea of endeavouring to make an historical chart for myself, which shall combine those two objects.

7th.—Ducks were the subject of discussion this morning at breakfast. My aunt told us, that the Chinese, by whom great numbers are consumed, usually hatch them by artificial heat.

The eggs are placed in boxes of sand, upon a brick hearth, which is kept at a proper degree of warmth, during the process; and the ducklings are fed with boiled rice, crabs, and crayfish for a fortnight. They are then supplied with an old *stepmother*, who leads them where they can find food; being first put into a boat, which is to be their constant habitation, and from which the whole flock, perhaps three or four hundred, go out to feed, and return at command.

The masters of the duck-boats row up and down the rivers, according to the opportunity of procuring food; and these birds obey them in an extraordinary manner. Several thousands, belonging to different boats, may be seen feeding in the same place, yet on a signal, each flock will follow their leader to their respective boats, without a single stranger having intruded.

Colonel Travers told us, that in a description of the south coast of Asia Minor, which he had lately read, a duck of extraordinary beauty is mentioned. The plumage is white, with orange and dark glossy spots, which are large and distinct, and in the males extremely brilliant. They fly in pairs, and their cry is loud and incessant. These ducks chiefly inhabit the cliffs of an island, and are peculiar to that part of the shore; and the author adds, what Colonel Travers considers to be a very singular fact—

that although the whole coast lies in nearly the same parallel of latitude, yet several species of the feathered race seem to be confined to particular districts. For instance, at the western end, there were multitudes of the red-legged partridge; the middle of the coast was occupied by crows, and every hole and crevice in every rock had its family of pigeons; then came the ducks; and when they disappeared, the elevated cliffs seemed to be usurped by eagles. As he advanced still further to the eastward, even the common gull, which is so plentiful every where else, became scarce, but its place was filled by swarms of the noisy sea-mew; and at the furthest extremity of the coast, he entered a shallow bay, which was covered with swans geese, and pelicans.

8th.—Mary was quite triumphant to-day in our genius argument, and produced two examples on her side, which she said were very strong.

The celebrated Dolomieu, she told us, entered very early in life into the religious order of Malta; but having unfortunately resented some insult, and killed his adversary, he was condemned to die, it being contrary to the rules of the order to use arms against any one but an 'enemy of the faith.' The grand-master, however, pardoned him; but the pardon not being

immediately confirmed by the pope, he continued in captivity nine months before he was released. By this time, Dolomieu had become, as it were, a new man; the solitude and silence of his prison, and the necessity of dispelling his inquietude by occupation, had given him a habit of deep meditation; and he determined to devote the rest of his life to the acquirement of knowledge. — He hesitated for some time between classical literature and natural history; but, at length, decided for natural history, in which he afterwards made so conspicuous a figure.

It cannot be denied, Mary says, that this is a proof that the mind may be led by circumstances to any pursuit. She then gave us some anecdotes of Baron Guyton de Morveau, as being still more favourable to her system.

‘Guyton’s education was not neglected in the common routine of classical and theoretical learning; but his father, who had a passion for building, employed various artificers about his house, and young Guyton insensibly caught a taste for mechanics. This, which might have been considered as a natural inclination, was merely the effect of example; and it was further excited by a circumstance that happened during his vacation. At a public sale in the neighbourhood, an old clock had remained unsold, owing to its bad condition, and he persuaded his father to give six francs for it. The

ardent boy soon took it to pieces, and cleaned it; he even added some parts that were wanting, and put the whole in order without assistance. In 1799, that is, fifty-four years afterwards, this clock was purchased at a higher price than was given for the estate and house together where it had originally been sold; having, during the whole of that time, preserved its movement in the most satisfactory manner. He once undertook the same operation for his mother's watch, and succeeded perfectly, though he was then only eight years of age. These details are sufficient to shew how impossible it is to predict, from the whims of childhood, the vocation likely to engage any individual at a more advanced period of life. This little boy appeared to have a genius for mechanics, in consequence of circumstances attending his infancy—but no one has shewn less taste for mechanics than Guyton de Morveau, during his long and brilliant career as a chemical philosopher.'

9th.—My uncle told us, to-day, a curious mode of catching fish by diving, which is practised in the Gulf of Patrasso, in Greece, and which is, he believes, peculiar to that place.

The diver, being provided with a rope made of a species of long grass, moves his boat where he perceives there is a rocky bottom; this done,

he throws the rope out so as to form a tolerably large circle; and such is the timid nature of the fish, that instead of rushing away, they never attempt to pass this imaginary barrier, which acts as a sort of talisman; they only descend to the bottom, and endeavour to conceal themselves amongst the rocks. After waiting a few moments till the charm has taken effect, the diver plunges in, and generally returns with several fine fish. As he seldom finds more than their heads concealed, there is the less difficulty in taking his prizes; and these divers are so dexterous, that they have a method of securing four or five fish under each arm, beside what they can carry in their hands.

The effect of the circle formed by the rope reminded Frederick of the singular manner in which pelicans and cormorants catch fish in concert with each other. They spread into a large circle at some distance from land; the pelicans flapping on the surface of the water with their great wings, and the cormorants diving beneath, till the fish contained within the circle are driven before them towards the land. As the circle becomes contracted, by the birds drawing closer together, the fish are at length brought within a narrow compass, where their pursuers find no difficulty in securing them.

One species of cormorant is so docile, Frederick added, that they are trained by the

Chinese to fish for their masters. Sir George Staunton saw several boats with a dozen of these birds in each ; at a signal they plunged into the water, and quickly returned with a prize in their mouths, which they never attempted to swallow without permission.

My aunt said, that those birds were formerly kept in this country for the same purpose ; but the English cormorants were not so tractable ; for a thong was tied round their neck to prevent their eating the fish. Charles the First, she says, had his master of cormorants as well as his falconers.

11th, Sunday.—My uncle, this morning, repeated his advice, never to allow ourselves to judge of detached phrases or single texts in the Bible, without carefully comparing them with similar passages in other parts ; and he added, that it was very unjust to charge the Bible with the errors of its translators, or to ascribe the mistakes and inconsistencies of human learning to the inspired original. ‘The wonder is,’ he says, ‘not that there are some mistakes, but that there are not many more, and that of those there should be so few of importance. It is, however, the duty of every body to make known those errors, slight as they are, and to try to remove all blemishes from a work of such high importance, as a correct translation in our own

language. Words have now a much more definite meaning than they had a few centuries ago ; and some words may then have fairly conveyed the original sense, which is now greatly perverted by their continuance.

‘ For instance, in Exodus iii. 22, it appears, that every woman is enjoined to *borrow* of her neighbour valuable jewels and raiment, and then to keep possession of them. But children,’ said he, ‘ should be taught that the Hebrew word, which our translators have rendered *borrow*, signifies to ask as a *gift*. It is the very word used in Psalm ii. 8,—“ Ask of me, and I shall give thee the heathen for thine inheritance ; ’ and the fact was this : God told Moses that the Israelites should not go out of Egypt empty, but that every woman should ask her neighbour for certain valuable presents, and that He would dispose the Egyptians to give them. And all this seems to have been perfectly just, when you consider the slavery that the Israelites had been obliged to endure, and the hardships which had been inflicted on them, not only by the king, but by the people, who “ made their lives bitter with hard bondage.”

‘ Josephus, the Jewish historian, represents this transaction agreeably to the true sense of the sacred text. He says, “ the Egyptians made gifts to the Hebrews ; some in order to induce them to depart quickly, and others on

account of their neighbourhood and friendship for them."

'As an additional confirmation of this being the true meaning of the expression,' my uncle continued, 'we may recollect that the custom of giving, receiving, and even demanding, presents is common to all parts of the East at this day; it is especially practised on the arrival or taking leave of strangers, and therefore may be well applied, in this case, to the departure of the Israelites. It seems to have been the same in all ages; for I need scarcely remind you of the "gold, and spices of very great store, and precious stones," that the Queen of Sheba gave to Solomon; nor of the magnificent gifts he presented to her when she was going away, even "all her desire, whatsoever she *asked*, beside that which Solomon gave her of his royal bounty." Nor is this exchange of presents looked upon as any degradation to dignity, nor any mark of a rapacious meanness.

'I have been the more desirous to explain that passage, because, from the ambiguity of one word the Israelites have been accused of cheating the Egyptians; and, what is of more consequence, it has been said that they were commanded to do so. But when the word is corrected, you see that these calumnies at once fall to the ground. And I would recommend you all to adopt a general rule in reading the Scriptures, of which

I have found the benefit. Whenever you meet with any expression that seems to be inconsistent with the moral justice of God—pause—compare the different parts where the same, or a similar phrase, occurs, and before you come to a rash conclusion, study the acceptation that the words had at the period when the present version was made. If it requires a knowledge of the original language, apply to some learned person; not so much to reason for you, as to furnish the data on which to satisfy yourselves. However bounded may be our notions of the qualities of the Deity, and though his attributes far transcend our conception, yet it is certain that our ideas of justice must have been derived from principles implanted by him; and no decree of His can ever be contrary to that justice—for the nature of God is immutable: He is “the same yesterday, to-day, and for ever.”

12th.—I am sure, Mamma, that you must feel very grateful to Colonel Travers for all the interesting things which I have picked up from him, and which I put in my journal for your amusement. To-day there was a conversation about our fisheries, and he related two facts which I am in hopes will be quite new to you.

You know that the great cod fishery which supplies almost all Europe with salt-fish, is on the sand-bank that extends from the island of

Newfoundland. The water is from twenty to sixty fathoms in depth ; and when the Colonel was returning from Canada with his regiment, he persuaded the captain of the ship to stop for some hours on this bank, in order to catch cod for the soldiers. He saw a great many hooked with long lines and pulled up ; and he observed, that when that was done very rapidly the air-bladder burst, and pushed part of the stomach out of the mouth. He explained to us that it is the air-bladder that enables fish to raise or lower themselves in the water, by taking in or letting out more or less air ; but this they can only do gradually ; and therefore when the air has been highly condensed at the bottom of the sea, by the pressure of fifty or sixty fathoms of water, it expands the bladder more quickly than the fish has the power of giving it vent. The air-bladder is *cured* or salted with the fish, and is then called the sound.

This led the conversation to the different depths which are inhabited by different classes of fish. My uncle told us that turbot, soles, and other flat fish, are not furnished with an air-bladder, because they never quit the bottom of the sea ; and Colonel Travers, to prove that some fish are not intended to sink very far below the surface, mentioned the following curious circumstance. When a whale is attacked by the sword-fish, he immediately dives ; and the sword-fish, not

being calculated by Nature to bear the enormous pressure of the sea at very great depth, is obliged to withdraw his weapon—if he cannot speedily extricate it, he dies. My uncle said that this fact helped to explain the facility with which those great monsters are killed by our Greenland fishermen : when a whale is struck by a harpoon, he imagines it to be a sword-fish, and, as usual, dives ; this he does with such velocity, that the harpooner is obliged to throw water on the part of the boat over which the harpoon-line runs, to prevent its taking fire ; but the power of diving is probably limited even in a whale, and the length of line, perhaps a mile or two, which he has taken out and is obliged to drag through the water, at last tires him—he stops—and the men, by slowly pulling in the line, in fact haul the boat towards him ; again he sets off—he is again tired—and is ultimately exhausted and killed by fatigue ! If he ran straight out, near the surface, no line could be long enough, or strong enough, to check him—whenever a whale does do so, the line snaps, and he escapes.

13th.—The last thing that Colonel Travers told us—for I am sorry to say he is gone away—was a pretty little story that he learned at Ceylon.

When the pearl-fishing in Condatchy Bay is going on, which is, he says, a most lively, amus-

ing scene, the Indians of the continent attend in great numbers, and being occasionally employed, they find ample opportunity to exercise their dexterity in sleight of hand and every sort of roguery. A set of these Indians contrived an ingenious method of cheating the boat-owner who employed them to open his oysters. While one of them made a preconcerted signal, whenever any pearls worth stealing were found, another, at the same moment, pretended to conceal about him a few small ones; and, while he thus attracted the attention of the superintendents, and occasioned some bustle, the real thief was able to secrete his prize.

This contrivance was discovered by one of the poor Ceylonese who attended the washing of the pearls; he made it known to the master of the boat, and then, having reason to dread the vengeance of the thieves, he immediately fled. For some days he proceeded without shelter, till arriving at the hut of a farmer, who lived near a cinnamon plantation belonging to government, he supplicated him for relief and a lodging. This man was very poor; he had a large family, and could with difficulty shelter the fugitive for one night; besides, suspecting that the story was not quite true, and that it was the thief instead of the informer who told it, he was not willing to let him continue there, lest it should bring himself under suspicion. The

Ceylonese was hurt at a doubt which he so ill deserved, and left the farmer early next morning, wandering he knew not whither, till he found himself, just when the sun was at its height, in a tangled and extensive forest. There he sat down to rest under a banyan-tree, whose self-rooted branches, entwined with creepers, had become nearly impenetrable;—and there he determined to remain, as long as the forest supplied him with fruit and wild honey. Fear had taken such possession of him, that he was afraid to venture back to the more inhabited parts of the country; and yet he was here in equal dread of the *Bedahs*, a race who live in the forests and mountains, and who refuse to associate with the more civilized Ceylonese.

It is supposed, Colonel Travers told us, that the *Bedahs* are descended from the original inhabitants; and that, having fled from the Ceylonese invaders, they have retained, with their ancient customs, their hatred and fear of the invaders. They live by hunting, they sleep in the trees, placing thorns and bushes on the ground round them, to give warning of approaching wild beasts; and, on every alarm, a *Bedah* climbs the highest branches with the expertness of a monkey.

There are some tribes of the *Bedahs* in the southern part of the island who are rather less wild, and who even carry on a little traffic with

the Ceylonese ; but they are so afraid of being made prisoners, that when they want to procure cloth, knives, iron, or anything of that kind, they approach the town where it is to be had, at night, and deposit in a conspicuous place a fair quantity of goods, such as ivory, or honey, along with a *talipot* leaf, on which they contrive to express what they want in exchange. On the next night they return, and generally find what they had demanded ; for, if their requests are neglected, they seldom fail to revenge themselves.

Fruits of various kinds are so abundant in Ceylon, that, for some time, our poor fugitive was supplied with tolerable sustenance ; and he often refreshed himself with the pure limpid water found in the *Bandura*, a most curious plant, whose leaves terminate in a kind of tube, which contains nearly half a pint of water, covered by a little valve. At last, anxiety brought on a low fever, his strength failed, and he lay under the banyan, expecting to die of hunger. Early one morning he was roused from a sort of half stupor, by hearing the low growl of a dog ; and, on opening his eyes, he saw a man stooping to place something near him ; he tried to speak—but the person had vanished. He had perceived, however, by his tall light figure, and his copper complexion, that the stranger was a *Bedah* ; and this would have

been a very terrific idea, had he not smiled as he went away, and pointed to a little basket that he had left. Plantains and refreshing fruits were again within his reach, and the poor starving man ate thankfully, and felt as if he should live. Every morning he found a fresh supply in the same place; and as his strength began to return, the Bedah, besides the basket of fruit, added some more nutritious food. This was dried meat preserved in honey, to keep it from the air; and tied up in a particular substance which grows on the betel tree, at the root of each leaf; it somewhat resembles a tough skin, and is of so strong a texture, that it retains water. He wished to thank the Bedah, and frequently beckoned to him to stay; but the good-natured savage shook his head, and disappeared.

When he felt himself quite recovered, and his strength restored, he resolved to procure employment, if possible, in the cinnamon groves. The grand harvest, which lasts from April to August, had begun; and he hoped that, in some of the various processes of cutting, scraping, or barking, which are parcelled out among several classes of peelers, or *choliahs*, he might find work.

On his way from the forest, in passing by the same house where he had been permitted to lodge one night, he perceived that the farmer's cattle had broken through the inclosure, and

made their way to the cinnamon-trees, on which they were then feasting. This tree is such a favourite with cattle, that they break down every fence to get to it; and most of the natives who live in the neighbourhood of those plantations are deterred from having cows, because all that are found trespassing there are forfeited.—This poor creature knew that, by giving information to the head officer, he might receive a reward which would relieve him from distress; but he had a more generous mind. He hastened to the farmer, and assisted him to drive back the cows and repair the fence, before they were discovered. The farmer was anxious to show his gratitude, and he felt convinced that he had wronged him by his former suspicion. By his recommendation to the superintendent of the cinnamon-groves, our wandering Ceylonese obtained employment; and in a short time felt himself so happy, that he had reason to reflect with satisfaction on his honesty and generosity.

As soon as he was able to save a little money, he purchased some few articles which he thought might be acceptable to the friendly Bedah; and by setting out in the night, he arrived early in the morning at the forest, and deposited his offering on the very spot where, for so many successive days, the food had been placed which saved his life. In vain he delayed there in hopes of seeing the Bedah, till he was obliged

to return to his work ; but as he heard the well-known growl at no great distance, he knew that he was observed, and that his present would be found. Colonel T. says, that the dogs of the Bedahs are remarkable for their sagacity in tracing game, and in distinguishing the scent of different animals. On the approach of a stranger, or of any dangerous beast, they first put their master on his guard, and then help to defend him ; and so invaluable are they to this tribe, that when their daughters marry, these dogs form their portion.

Our industrious Ceylonese had built a hut, during his residence at the cinnamon plantation. It was formed from a single cocoa-nut tree ; the stem furnished posts ; the branches supplied rafters ; and the leaves formed a covering sufficient to repel both sun and rain. The Ceylonese huts are fastened entirely by withes of ratan, or by *coya* rope, which is made of the fibrous threads of the husk of the cocoa-nut. They are sometimes strengthened with slender pieces of wood or bamboo, and daubed over with clay ; and round the walls are benches to sit or to sleep on.

Colonel Travers took the opportunity of telling us, that the cinnamon-twigs are first scraped with a peculiar kind of knife, convex at one side, and concave opposite ; the bark is then slit with the point, and the convex side of the knife is used

to loosen it, till it can be taken off entire ; it appears like a tube in that state, and the pieces are laid one within another, and spread to dry. When quite dried, they are tied up in bundles of about thirty pounds weight, and are carried by the chollahs to the cinnamon store-houses at Columbo.

Being no longer afraid of the pearl-gatherers, he returned to Condatchy ; and, as it is a usual practice to search for pearls which may by chance have dropped from the oysters while they lie in the pits, he also went to see how far his present good fortune would continue to befriend him. Those pits are dug about two feet deep in the ground, and lined with mats ; and the oysters are left there to putrefy, as they are then easily opened without injuring the pearls. His search was successful beyond his hopes ; he found a pearl of uncommon size, and joyfully carried it to the collector, who rewarded him with a large sum of money.

It is easy, dear Mamma, to guess the rest of the story. He bought cloth, axes, knives, and various useful things ; and making his way once more to the banyan tree, he laid these offerings of gratitude in the spot so well known to him and the good Bedah—and again he heard the faithful dog growl his knowledge of his being there. He then visited the farmer, and found him in the greatest distress ; for his cattle having

again trespassed on the cinnamon-grounds, they had been all seized. The kind-hearted Ceylonese bestowed on him a sum more than sufficient to replace his cows; and it was difficult to say which felt the most happy—the farmer suddenly relieved, or the generous creature who relieved him.

16th.—We all petitioned my uncle to read the *Tempest* to us yesterday evening. He consented, upon condition that Mary should assist; and it was arranged that she should read the parts of *Miranda* and *Ariel*.

Mary is so timid, that she does not like even such a moderate exhibition: she complied, however, and they both read so delightfully, that every one perceived beauties in that play which they had never noticed before. At the end of each act, we talked it over; and my uncle encouraged every one to give their opinions, which he says is the best way of inducing people to think.

My aunt said that none of Shakspeare's plays are so perfect, as to the time in which the action takes place, as the *Tempest*, or display so much imagination; for, while he seems to leave one at liberty to wander through the wild and the wonderful, yet such is the correctness of his taste, that in this piece he never suffers it to pass the bounds of consistency.

Caroline was most pleased with the part of the 'delicate' Ariel. 'It is quite charming,' she said, 'he is so well imagined: his qualities and offices and his expressions are so suitable to each other, and so nicely described by himself. Besides, he seems so amiable and good-natured to the shipwrecked strangers, that, even while we consider him as the artful agent of the magician, he seems to have the qualities of almost a celestial being.

I asked her which she liked best, Ariel, or the fairy sprites in *Midsummer Night's Dream*. 'Like you, Bertha, I delight in all Shakspeare's fairy-land,' said she; 'but I think Ariel in every way superior to Puck: even his tricks are more elegant and graceful, and he seems to sympathise with the people he is teasing; but Puck, however amusing, is a wild mad-cap, that revels in his antics, and ridicules the poor victims of his merry mischief. I like to think of Ariel as he "lies in the cowslip's bell," or "rides on the curled clouds, to do his master's bidding," with such swiftness as to "drink the air before him."'

My uncle praised the drawing of Caliban's character. 'Every time I read it,' said he, 'I see fresh proofs of its complete originality.—Shakspeare could have had no model for such a creature—it could only be the work of his

own extraordinary imagination, and it shews what powers of invention he possessed. Caliban is just what the offspring of a witch and a demon should be: he is a prodigy of cruelty and malice; and Shakspeare heightens the effect, by giving him a language so poetical and yet so gross, that all he says, whether in brutal malice, or in uncouth kindness, is in perfect keeping with his general character. It expresses the instinctive barbarity of the monster; and the mind is throughout divided between the detestation excited by such a horrible being, and astonishment at the versatile genius by which it was conceived.'

'Miranda is my favourite,' said my aunt; 'I am sure there is as little common-place in it as in either of the singular characters you have been praising. In hers, innocence and gentleness are the predominant features; while the union of the softest tenderness for Ferdinand with her candour and dutiful deference to her mysterious father, give it the most amiable finish; and I think the skill of Shakspeare in painting it is, at least, equal to that shewn in any other of the play; for the many beautiful little touches by which it is brought out, appear to me to shew more talent than when violence of passion and great strength of expression are used.'

' On the bat's back I do fly
After summer merrily.'

I repeated these lines in Ariel's song, and asked the meaning of 'after summer.' 'Some critics,' said my uncle, 'have thought it should be *after sunset*, because Ariel speaks of riding on the *bat*; but commentators delight in deep and hidden meanings, and it has therefore been suggested, that as the fairy tribe dislike winter, Ariel, who is now to be restored to liberty, rejoices that he may follow summer round the globe; and therefore he is said to *fly after summer*.'

17th.—We have been reading the life of that delightful musician, Mozart; and he is claimed by each party. But I think he can give very little support to Mary; for though his father was a teacher of music, and early began to instruct him, his rapid progress and juvenile success seem to have gone far beyond the effect of circumstances, which in a hundred cases have been the same with other musical teachers, and other children. Mozart was but four years old when his great delight was seeking for *thirds* on the piano-forte. When five, he learned difficult pieces of music from his father so quickly, that he could immediately repeat them; and in the following year, he invented little sonatas, which he played for his father, who always wrote them

down to encourage him.—Music was introduced into all his sports, none of which were acceptable to him without it; and if sometimes a fondness for the usual occupations of childhood did influence his mind, yet music soon became again the favourite object.

Before he was six years of age, his father, observing him writing busily, asked what he was doing; the little boy said, he was composing a concerto for the harpsichord. The father took the paper, and laughed heartily at the blots and scribbles; but when he examined it with more attention, he shewed it to a friend with tears of delight, saying, ‘Look, my friend, every thing is composed according to the rules; it is a pity that the piece cannot be made use of; but it is too difficult, nobody would be able to play it.’

The progress of this wonderful child was equal to this beginning; and in various public exhibitions in Germany, and particularly at Vienna, he excited, at a very early age, the astonishment of all musical people, by his science, by the correctness of his ear, and by his powerful execution. At the age of thirteen, he composed his first opera; and you well know, Mamma, the numerous beautiful compositions which distinguished his short life; for he died at the age of thirty-six. Surely this was a genius!

18th, *Sunday*.—My uncle read to us, this morning, the chapters which relate the humbling of Pharaoh, and the going forth of the Israelites; he afterwards said, ‘in the wonderful judgments inflicted on the Egyptians, and in the miraculous institution of the Passover, when the destroying angel passed over the house of every Israelite, we see, my dear children, the operation of that Being whose will controls the elements of nature, and directs the passions of mankind.

‘No human force is exercised—no Israelite lifts the sword; yet the Egyptian monarch is humbled, his people are terrified, and both urge the departure of the Israelites; who even demand, and obtain from their late oppressors, silver and gold, as payment for their past labours. “Rise up and get you forth,” said Pharaoh, and they immediately commenced their march, before his hardened mind again repented of yielding to the decrees of the Almighty.’

Wentworth asked his father, how the Israelites could carry their kneading troughs on their shoulders.

‘It appears,’ said my uncle, ‘from the accounts of various travellers, that to this day the Arabs, who dwell in the countries through which the Israelites passed, are in the habit of eating unleavened cakes; and that the vessels still used there for kneading them, are small wooden bowls; these, you see, could be very conveniently

bound up in the kneading-cloths, and tied on their shoulders. The Arabs have, also, among their travelling furniture, a round thick piece of leather, which they lay on the ground, and which serves them to eat upon; round it there is a row of rings, by which it is drawn together with a chain; and it hangs by a hook at the end of the chain to the side of the camel, in travelling. In this leather they carry their meal, made into dough; and when the repast is over, they wrap up in it all the fragments that remain.'

'I wonder,' said Frederick, who was looking at the map, 'I wonder, heavily laden as they must have been, that they did not take the shortest road to the promised land, instead of going round about by the Red Sea.'

'The regular route to the promised land,' my uncle replied, 'was certainly along the coast of the Mediterranean, towards Gaza and the other cities of Palestine, which were a portion of Canaan, and at no great distance from the Lower Egypt. But the way by which it was the Divine will to lead them, was through the Red Sea; as being not only impracticable for their return, but being eminently calculated to impress them with a sense of the miraculous power which guided and protected them through the "deep."'

I asked my uncle, then, what was meant by the word wilderness. He said, 'The word occurs in a great many places, both in the Old and New

Testament, where it sometimes means a wild, uninhabited desert, and sometimes only an uncultivated plain: the wilderness, through which the Israelites were conducted, partook of both these descriptions, being partly rocky, and partly a sandy, unproductive district. It occupied the space between the two branches of the Arabian Gulf, which was sometimes called in Hebrew, and is, indeed, at this day, in the Coptic language, the "Sea of Weeds."

'Why, then, do we give it the name of the Red Sea?'

'We have borrowed the term from the Greeks,' said my uncle: 'from whence they derived it is not so easily answered; certainly not from the colour of the water, or of the sand at the bottom. The most probable notion is that it was originally called the sea of *Edom*, as it washed the coast of that country; and that, as *Edom* signifies *red* in Hebrew, the Greeks, not understanding the geographical allusion, simply translated it, just as the Romans and ourselves have done after them.'

A general conversation then ensued about the passage of the Israelites through the sea; and I shall write here some of what I picked up, by way of exercise only—for I am sure, Mamma, that you are already well acquainted with all that is known on the subject.

The exact spot at which they quitted the

Egyptian shore has been much contested among commentators ; but the greatest number of opinions seems to be in favour of Clysmā, a point several hours' journey from the town of Suez, which stands at the head of the western gulf. The names that some of the places in the vicinity still retain, appear to confirm this supposition ; for instance, the ridge of hills extending from the Nile to this part of the coast is called Ataka, which means *deliverance* ; and the narrow plain to the southward of that ridge preserves the name of Wadi-et-tiheb, or the *Valley of the Wandering*. On the opposite shore of the Red Sea there is a headland called Ras Mousa, or the *Cape of Moses* ; farther to the southward, Hammam Faraun, *Pharaoh's Baths* ; and the general name of this part of the gulf is Bahr el Kolsum, or the *Bay of Submission*. From these circumstances, it may be concluded that the Israelites crossed the western arm of the Red Sea, about twelve or thirteen miles from Suez ; and it appears, from my uncle's maps, that the sea there is eight or nine miles broad.

My uncle says, it is the opinion of some geographers that formerly the Red Sea did not stop at Suez ; and modern travellers have described a large plain which is considerably lower than the surface of the sea, and which extends seven or eight leagues to the northward of that town. This plain is two leagues in breadth ; and from

the thick layer of salt, and the quantity of shells which are everywhere found under the soil, they say there can be no doubt that it was once the bed of the sea. I asked what could have driven the sea out, if ever it had been there? But he said there was no difficulty in that; for rivers and narrow seas are continually changing their boundaries by the sand which their tides and currents throw up; and as soon as ever the Red Sea had washed up a new barrier at Suez, evaporation in that climate would rapidly dry the part that had been cut off.

It has been asked, were there not ledges of rock lying across the Red Sea, on which, when the tide was out, the Israelites might have forded it? 'But,' says my uncle, 'if we do not believe the transaction to have been miraculous, we may as well not believe it at all; for the event, as well as the miracle, rest on precisely the same authority. At the same time, do not suppose that I wish to discourage these inquiries; they are of considerable use;—they lead to the investigation of facts, and the more strictly the Bible is examined, the more we shall be satisfied of its truth. The attention of the celebrated travellers, Niebuhr and Bruce, was particularly directed to that question; and they distinctly assert that there are no rocks there whatever.'

My uncle concluded the conversation by saying, 'Many of the Fathers have supposed it to have

been the opinion of St. Paul, that the passage through the waters of the Red Sea was intended as a type of the Christian baptism, and of our conditional resurrection to eternal happiness. And it was this idea that probably induced the framers of our liturgy to introduce the history of that event into the service appointed for the day of our Lord's resurrection.'

19th.—We amused ourselves for some time after dinner this evening with our favourite question-play, animal, vegetable, and mineral; Mari-
anne is well acquainted with it.

I thought of sponge as a good puzzling thing: however, it puzzled me not a little, in the progress of their questions, to describe it satisfactorily. In the first place, I had heard some one tell you that sponge was a vegetable production; but I have since read that it is a substance formed by some species of marine worm: so when I was forced to give distinct answers to the questions, was it animal, or was it vegetable, I was divided between those two ideas. Then came questions as to what part of the world it was found in; and I set them all wrong by saying, only in the Mediterranean. In short, I found that, even in children's plays, people may have to blush for their ignorance.

After I had puzzled in and out of the question, and that our play was ended, my uncle

told me that sponges, of which there are now known more than a hundred different species, are found in a multitude of places, on the shores of both the old and new Continents. 'Those most valued in the arts,' said he, 'are inhabitants of the Mediterranean, and part of the Indian Ocean; two small kinds of sponge thrive even on the frozen shores of Greenland; and forty species have been discovered on the coasts of Great Britain. They are found equally in places that are always covered by the sea, and in those which it leaves dry with the ebb tide. They adhere to rocks, and spread all over their surface. In some places they keep possession of the most exposed cliffs; but they thrive best in sheltered cavities, and are found lining the walls of submarine caves, attaching themselves indifferently to mineral or vegetable, or even to animal substances.

'The size to which sponge attains is very uncertain. I lately saw an account of one found at Singapore, in the East Indies, which was shaped like a goblet, and measured round the brim fifty-one inches; the stem was seventeen inches, and it contained thirty-six quarts of water! Naturalists have agreed to seven general divisions of form; so as to make something like an arrangement of this most singular class of organized beings.'

I interrupted my uncle here, to ask whether,

in calling them organized beings, he meant the substance of the sponge, or the insects that are supposed to form it.

‘It is curious,’ replied he, ‘that, two thousand years ago, the Greeks were occupied with this very inquiry; some endeavouring to prove the vitality of sponge, and others to show that it was merely the work of certain worms: and, even so late as the year 1752, Peyssonnel, the naturalist, communicated to the Royal Society a paper in support of this last opinion.’

‘Most naturalists, however, now agree in regarding sponge as a *zoophyte*, or a kind of animal approaching nearly to the form and nature of a plant; and Linnæus himself, latterly, classed it amongst animals. As the large orifices appeared to be the only means of entrance to the internal canals, it was supposed that the nourishment of this animal was drawn in through them; but later discoveries have shown that, besides those apertures, there are minute pores over the whole surface; that through these pores the water is imbibed, by which the creature is nourished; and that the large round holes convey a constant stream of water away *from* the interior of the body. This stream carries off the particles of matter which are constantly separating from the interior, and which are not only perceptible by the assistance of the microscope, but may be occasionally seen by the naked eye,

like small flakes. When a living sponge is allowed to remain a day at rest, in a white vessel filled with pure sea-water, an accumulation of feculent matter is always found immediately under each orifice. If it is confined in the same basin of water for two days, the currents appear to cease; but, on plunging it again into water newly taken from the sea, they are renewed in a few minutes; and the continual circulation of water through the body, Dr. Grant, who appears to have studied this subject with great perseverance, says, he no longer doubts, forms one of the living functions of this animal.

‘It would only burden your memory,’ continued my uncle, ‘were I to tell you all the various opinions which have been formed respecting the anatomy of the sponge. I will merely say, that Dr. Grant affirms, though in opposition to M. Cuvier, that the fibrous part of the sponge, which is insoluble in water, and forms a net-work through every part of the body, is the skeleton of this zoophyte, serving, as in other animals, to give form to the body, and support to the softer organs.

‘Sponge attaches itself sometimes to marine plants, so as to choke up their pores. Small bits of the same species will spread towards each other, and become one piece; and it is amusing to observe, Dr. Grant tells us, the growth of the young *Spongia parasitica* on the back and legs

of a species of crab, where they frequently collect to the number of forty or fifty, interrupting the motion of its joints, and spreading like a mantle over its back, or perhaps rising in fantastic ornaments upon its head, which the crab is unable to remove.'

21st.—When I parted from Mrs. P. at Falmouth, my uncle, who was much pleased with her kindness to me, made her promise to pay a visit here in some little time. That time has, at last, come. We have her now actually in the house, and I have once more the pleasure of being with a friend who was so kind and tender to me when I left you, my beloved Mamma.—How many little circumstances are recalled to my mind by seeing her! She has just the same quiet, composed look that she used to have; and, though always ready to converse and to impart the information she possesses, yet her countenance seldom loses a certain expression of sadness.

She arrived last night, and has promised to stay till after Christmas. I believe a few other friends are to be here also; but I am no longer such a fool about strangers.

Many a time, things which you have said to me, and which then I scarcely heeded, return to my mind. How often, for instance, you have told me that we lose much real enjoyment by

that sort of fear or reserve which I used to feel at the sight of a new face ; and now that I have learned to listen attentively to conversation, I see what amusement, as well as knowledge one may gain from the mixture of characters to be met with in society. Indeed, every day shows me how much real goodness there is, though of various kinds, among people who at first sight seem only intent on their own affairs.

I am sure that I at least have received a great deal of kindness in my short life—and particularly since I have ceased to be what you used to called *farouche*.

23rd.—This day has been remarkably cold and wet, and stormy ; nothing could appear more dreary ; and when I looked out, I persuaded myself that I felt quite melancholy. We had, notwithstanding, been all as cheerful as usual, and had contrived plenty of amusements for ourselves, in addition to shuttlecock, which warms one so comfortably ; but this very dark and gloomy day we could scarcely distinguish our little feathery plaything after three o'clock.

In the evening Mrs. P. taught us a new way of capping verses, which is a little more difficult, but I think much more amusing than the common method. Instead of each person being confined to a single line, as much of a poem is to be repeated as will complete the sense ; and the

succeeding quotations are all to allude either to one general subject, or at least to something touched upon by the previous speaker.

I will give you a sample in which we all joined:—

UNCLE. Heap on more coals: the wind is chill;
But let it whistle as it will,
We'll keep our merry Christmas still.

AUNT. Still linger in our northern clime
Some remnants of the good old time;
And still, within our vallies here,
We hold the kindred title dear.

FREDERICK. Decrepit now, December moves along
The plashy plains.

CAROLINE. Phœbus arise,
And paint the sable skies
With azure, white, and red;
Rouse Memnon's mother, from her Tithon's bed,
That she with roses thy career may spread.

BERTHA. Sad wears the hour! heavy and drear
Creeps, with slow pace, the waning year:
And sullen, sullen heaves the blast
Its deeps sighs o'er the lonely waste!

WENTWORTH. Who loves not more the night of June
Than dull December's gloomy noon;
The moonlight than the fog of frost?
And can we say which cheats the most?

MRS. P. Mustering his storms, a sordid host,
Lo! Winter desolates the year.

MARY. Yet gentle hours advance their wing,
And Fancy, mocking winter's night,
With flowers, and dews, and streaming light
Already decks the new-born spring.

December 24th.—

'Twas Christmas broach'd the mightiest ale,
'Twas Christmas told the merriest tale;
A Christmas gambol oft could cheer
The poor man's heart through half the year.

How happy every one looks in these good Christmas times! Besides those feelings of gratitude and hope, which now come home to every Christian's breast, it is delightful to see the satisfaction the rich feel in this country in sharing their comforts with the poor.

I need scarcely tell you, who know my uncle and aunt so well, how much they enjoy the pleasure of giving food and clothing and blankets to those who are in want; while to the cottagers who do not require such assistance, they make some useful present, such as a book or some little article, which is sure to be highly valued, as it marks the approbation of their landlord. Of course the Franklins and our old basket-maker have not been forgotten. My aunt says she likes to make the poor more than commonly comfortable now, that they may remember the season with pleasure.

Farmer Moreland, and two or three other rich farmers in the neighbourhood, are very considerate of the comforts of their labouring men at this season; and they have joined with my uncle and aunt in trying, by giving them constant employment, to enable them to struggle on by their

own exertions without applying to the parish for support. Many have large families, some of which are taught, even while very young, to help their parents; and it is to these people that my aunt distributes the largest portions of her Christmas bounty.

In speaking of Christmas, my uncle told me that in the heathen times of these countries, and of the northern parts of Europe, a festival took place exactly at this season, which was dedicated to the sun, the chief deity of our heathen ancestors; and when they were converted to Christianity, it was thought prudent that they should continue to have their festival, although the object of it was of course changed. It was called *Jol* or *Yule*—a Gothic word, signifying a feast, and particularly applied to a religious one. Christmas is even still called *Yule* in many places in the North of England; and it is said that the custom of making a large fire on Christmas eve, on which great logs of wood are piled, is still kept up. These are called *Yule clogs*, and, before they are quite consumed, a fragment of them is taken out, and preserved safely for the next year.

This is probably one of the remnants, my uncle says, of the feasts of fire instituted by the worshippers of Bali, from whom there appears reason to think the Druids were directly descended; as a coincidence of customs, words,

names, and ancient worship is in many instances observable.

Just as we had done tea this evening, while my uncle was talking on this subject, he was interrupted by a loud ringing at the hall-door, and it was scarcely opened when there was such a noise in the hall, such singing, talking, laughing, and dancing, that I was alarmed at first; but my aunt told me it was only the *Mummers*. We went to look at them, and I understood that they were acting St. George and the Dragon; but it was such a strange confused medley, that I could only distinguish a word or two. They had all hideous masks, and were dressed up in the most grotesque way; and everybody was highly diverted except poor little Grace: she was so frightened by the bustle and strange figures, that my uncle was obliged to reason with her. A word or a look from him has unspeakable power over the minds of all the family, and indeed of all who know him.

The mummers' song I could not understand, except one stanza, which they repeated always more distinctly than the rest, as a hint, I suppose, to my uncle:—

In Christmas time is found
The best of stout old beer,
And if it now abound,
We shall have dainty cheer;
Then merrily dance we round,
And so conclude the year.

My uncle good-humouredly gave them a few shillings to get their 'stout old beer,' and they hurried off to visit some other house.

25th.—We all met in health and cheerfulness this good Christmas morning, and in our heartfelt wishes for mutual happiness, yours, dear Mamma, was included as ardently as if you had been present.

To the usual old-fashioned expressions of kindness, my aunt added, in her impressive manner, a tender wish that we might receive such gracious aid from above, as would enable us to rejoice indeed on this great day.

After some general conversation, my uncle explained to us the 45th Psalm, which is appointed for the service of Christmas-day; and which, he says, like many of the other psalms, is constantly read and but little understood.

'It appears,' said he, 'to be a song of congratulation upon the marriage of a great king; but, from a consideration of all the subjects on which it touches, there is no doubt that it prophetically alludes to the mystical wedding of Christ with his church. This was the unanimous opinion of all the Jewish expositors—for though prejudice prevented them from discovering the completion of the prophecies in our Saviour, yet they well understood their meaning, and all allowed that this psalm related to Him, and not to any earthly prince.'

‘ This figure, of the union of a husband and wife, has been consecrated by our Lord himself, to signify his own union with his church, in the parable of the king making a marriage for his son. Some commentators have imagined that the marriage of Solomon with Pharaoh’s daughter was the subject of the 45th Psalm ; but it is in many respects wholly inapplicable to that king. The hero of the poem is a warrior, who reigns at length by conquest over his vanquished enemies : Solomon, on the contrary, enjoyed a long reign of uninterrupted peace. He is also distinguished by his love of righteousness ; whereas Solomon, during the latter part of his reign, fell far short of the excellence here described. But above all, the king is addressed by the title of God, in a manner which is never applied to any earthly king.

‘ The Psalmist begins with our Lord’s first appearance in the human form, and passing rapidly through the different periods of Christianity, makes them the groundwork of this mystic and inspired song, which may be divided into three parts.

‘ The first three verses describe our Lord on earth in the days of his humiliation. The second section consists of the five following verses, which relate to the propagation of the gospel by our Lord’s victory over his enemies ; and this in-

cludes the whole period, from his ascension to the time, not yet arrived, of the fulfilling of the *Gentiles*. The sequel alludes to the re-marriage—that is, to the restoration of the converted *Jews* to the bosom of the true church.

‘ “Thou art fairer than the children of men.” Though we have no account in the gospels of our Saviour’s person, yet it is evident, from many circumstances, that there must have been a peculiar dignity in his appearance. But it was the sanctity of his manners; his perfect obedience to the will of God; the vast scope of his mind, which comprehended all knowledge; his power to resist all temptation, and to despise shame and to endure pain and death, to which that expression alludes—this was the beauty with which he was adorned beyond the sons of men.

‘ “Full of grace are thy lips.” This is put figuratively, for that perfect doctrine which he delivered, and which, if sincerely adopted, was to sustain the contrite, to console the afflicted, and to reclaim the guilty.

‘ “The king’s enemies” are the wicked passions of mankind, against whom he wages a spiritual war; and the “sword and arrows,” St. Paul tells us, mean “the sword of God.”

‘ The seventh and eighth verses show the King seated on the throne of his mediatorial kingdom, where he is addressed as God, whose throne is

everlasting, and as a Monarch whose heart is set upon justice and righteousness.

‘ In the first dispensation of the law through Moses, the perfumed garments of the priest were typical of the graces and virtues of the Redeemer, and of the excellence of his word ; so the Psalmist describes the King, of whom the high priest was the representative, as scented with myrrh, aloes, and cassia.

‘ In the figurative language of scripture, “ king’s daughters ” express peoples and nations, and here mean, that the empires converted to the faith of Christ will shine in the beauty of holiness, and will be united to the Messiah’s kingdom.

‘ The “ Queen ” evidently represents the Hebrew Church, re-united by conversion in the fulness of time. The restoration of Israel to the situation of consort in the Messiah’s kingdom is the constant strain of prophecy ; whole chapters might be quoted ; but I think it will be an interesting employment to some of you to search for them yourselves. I will only remind you of that passage in the epistle to the Romans, where St. Paul says, that blindness is *in part* only happened to Israel, till the time shall arrive for the fulness of the Gentiles to come in ; and then all Israel shall be saved.

‘ The Queen’s “ vesture of gold ” denotes those real treasures, of which the church is the depo-

sitory, the written word, and the dispensation of its gracious promises to mankind.

“Forget thine own people, and thy father’s house.” This applies to the ancient Jewish religion, and its typical ceremonies and sacrifices, now no longer necessary. The remainder of the psalm alludes to the churches established under “the King;” to the simplicity and excellence of the Christian dispensation; and closes with an assurance that the children of the Queen Consort, that is, the church, after collecting the lost sheep of Israel, shall be, as their fathers were, God’s peculiar people.’

My uncle concluded by saying, that this beautiful psalm, which is written in such majestic language, and presents such cheering hopes to Christians, Jews, and Gentiles, has been a constant subject of discussion amongst our learned divines; and advised us to read with attention the excellent commentaries on it by Bishop Horne, and Bishop Horsley.

26th.—This day is so calm and bright that it is not like winter; it almost brings to my mind some of our own days at home. Oh! Mamma, if you were but here, all would be delightful.

We are all going to walk to Farmer Moreland’s, except Wentworth and Frederick, who are mounting their ponies to visit a friend just returned from Eton.

I am called—Yes, quite ready. Good day, dear Mamma.

Well, Mamma, evening has come, and I have but little to tell you about our Christmas visit to Farmer Moreland and his dame, which was happily accomplished; but a great deal to tell you about Wentworth and Frederick, and their adventures. When they had ridden about a mile, they were stopped by a little boy, who came running from a lane in the wood, crying piteously, ‘Mother, mother! oh, come to mother!’ To all their questions he gave no other answer but ‘Come to mother! oh, do come, she is a-dying!’ The child was a very little creature, and seemed scarcely to know any other words.

My cousins, without hesitation, or any thought about their ride, determined to follow the child, who, though he could not say much, knew very well what to do. He led them along one of the green lanes a considerable distance into the wood, and there they found his poor mother lying, without any other shelter than that of a large spreading holly—without blanket or covering—her head resting on a little bundle, and looking deadly pale. The child ran towards her, and gently patting her face, cried, ‘Here, mother; look, look.’

As Wentworth approached, she opened her eyes, and seeing a benevolent countenance, smiled faintly. She tried to raise herself, but

could not. In reply to his inquiries, she made him understand that, having travelled two days with little rest or food, suffering much from grief, along with fatigue, she had grown so ill that she was obliged to stop there. Not seeing any cottage near, in which she could beg a lodging, and feeling totally unable to walk farther, she had lain there many hours, but had not seen any one pass, and fearing that the child would be starved, she had sent him in search of some kind-hearted person. She added that she was sure her illness was a fever; and as there was, therefore, little chance of her being admitted into any house, all she wished for was a shed to cover her, some water to drink, and some bread for her little boy.

My cousins, promising assistance, rode home instantly, in hopes of finding my uncle, but we were all at Farmer Moreland's. They tried then to find some one who could erect a shed over the poor woman; but it was a holyday, no labourers were at work; and the steward, who was the only person they found, had received orders not to leave the yards all day, because many idle people might be about. He told Wentworth he could easily supply materials for a shed, if there was any one to build it. Wentworth and Frederick looked at each other for a moment, and then both said together—"Let us do it ourselves, and give up the ride."

Each had been afraid of disappointing his brother by the proposal, but they agreed to it with equal good will, and set about their new occupation so earnestly, that in a quarter of an hour the garden ass-cart was loaded with straw and stakes, and the necessary tools. Before they went away, they applied to my aunt's housekeeper for bread and medicine; and she very good-naturedly went herself to see what state the woman was in, and what could be done for her. She afterwards told my aunt, that it was 'a beautiful sight to see the kindness of the young gentlemen, just as careful, Ma'am, not to disturb the sick beggar-woman as if she was a lady, and they so happy, Ma'am, and never seeming to cast a thought about their ride.' While they were at work, the housekeeper learned the history of the unfortunate creature; she thinks her dangerously ill, and has therefore procured a good old woman to take care of her.

My cousins not being very expert in driving stakes into the ground, or in fastening on thatch, it was nearly dark when they reached home. We had long returned from our walk, and had been listening to the history the housekeeper gave. My aunt and uncle were very much pleased at hearing of the benevolence and the decision with which Wentworth and Frederick had acted; and they determined not to interfere with them till their task was completed.

The story of the poor woman can be told in a few words. When very young, only sixteen, she was tempted to leave her father's cottage, and to go off secretly with an idle wandering man, belonging to a party of gipsies, to whom she was afterwards married. Her husband had lately grown very unkind, and last week he forsook her entirely. She heard that he had come to the forest of Deane, and, without waiting to make further inquiry, she took her little son, and set off in search of her wicked husband. Her parents are dead, and she has no friends but the gipsies, among whom she has lived for several years; she says they are bad people, indeed, and to leave her boy with them would be his ruin. Her only anxiety is about him; were she sure of his being in safe hands, she says she has no longer any wish to live.

The housekeeper inquired the name of the child; but his mother acknowledged that he had never been christened, as the people she was with did not attend to those kind of things. He has generally been called *Quick-finger*, amongst them, because he was so clever at little thefts; but she had intended, she says, to have had him baptized, and to call him Charley, after her own father. She then fell into an agony of grief, at the remembrance of her father, and the time when she was happy and innocent, as well as at the wickedness her poor little boy has already been taught.

11/1831
10/1831

Dec. 28th.—During our passage from Brazil, Captain M. lent me one of your old favourites, Anson's Voyage; and, next to Robinson Crusoe, it interested me more than any thing of that kind I ever read. You may guess then with what pleasure I have been looking over the account of a late visit to Juan Fernandez, by Mr. Scouler, who was employed by the Hudson's Bay Company, to examine the natural history of the north-west coast of America. I think two or three little extracts will amuse you; and I must tell you, by the way, that Mr. Scouler seems to feel great admiration for *our* city of Rio, and the bay, and the view from the Corcovado, and all our beautiful plants, birds, and insects.

'Dec. 14, 1824.—The island of Juan Fernandez was approached with equal interest by every one in the vessel, but with different feelings; as classic ground by the seamen, and as a new field for research by the naturalist.

'We landed at a small bay at the northern extremity of the island. The level land near the coast had more resemblance to an European corn-field, than to a desolate valley in the Pacific Ocean, being entirely overgrown with oats, interspersed in different places with wild carrots. On penetrating through the corn-fields, we discovered a small cavern, excavated in the decomposing rock, and bearing evident traces of hav-

ing been recently inhabited. A kind of substitute for a lamp hung from the roof, and the quantity of bones scattered about, showed there was no scarcity of provisions. Near this, a natural arch, about seven feet high, opened into a small way, bounded on all sides by steep perpendicular rocks, which afforded an inaccessible retreat to multitudes of sea birds.

‘ The next day, on approaching the landing place in Cumberland Bay, we were surprised by the appearance of smoke rising among the trees ; and we had the pleasure of finding an Englishman there. When he first saw our boat, he was afraid it belonged to a Spanish privateer, and had concealed himself in the woods, as they had formerly destroyed his little establishment. He belonged to a party of English and Chilians, employed in sending the skins of cattle, which are now plentiful, to Chili. We were delighted with the beautiful situation where they had fixed their dwelling, close to a fine stream, and surrounded by a shrubbery of *Fuchsia*, mixed with peach and apple-trees, pears, figs, vines, and strawberries, rue, mint, radish, and Indian cress, besides oats, were all growing in the greatest profusion ; and the sea abounded with fish.

‘ Our new friend had a little collection of English books ; and one piece of furniture, which seemed particularly valuable,—an old iron pot,

though without a bottom ; but he had fitted a wooden one to it, and when he had occasion to boil any thing, he plunged the pot into the earth, and kindled a fire round its sides.

‘ We made an excursion to the interior, and found many beautiful plants and shrubs. The dry soil was covered by an evergreen *arbutus*, and a shrubby *campanula*, and every sheltered rock afforded a different species of fern, the greatest vegetable ornament of the island. We refreshed ourselves with strawberries, which were small and pale, but of a very agreeable flavour ; and the vine plants were loaded with grapes ; they were still unripe.’

I am quite disappointed at Mr. Scouler’s not mentioning the myrtle trees described in Anson’s Voyage, that tall wood of myrtles that screened the lawn where the commodore had pitched his tent, and which, sweeping round it in the form of a theatre, extended up to the rising ground. I should like to have known what species of myrtle produced timber of forty feet in length. But, above all, I feel disappointed at his account of the cavern ; I was thinking of Alexander Selkirk, and could not help hoping that it was to prove the very one in which he had lived ; or perhaps that some other romantic Selkirk was then its solitary master, instead of those Chilian cattle-killers.

29th.—There was a long conversation to-day on corals, corallines, and particularly on the formation of islands of that substance, which seems to take place so rapidly in some parts of the world.

Mr. Salt, the traveller, says, that the islands in the Bay of Amphila are composed entirely of marine remains, strongly cemented together, and now forming solid masses, the surface of which is covered by only a thin layer of soil. These marine remains are chiefly corallines, madre-pores, and a great variety of sea-shells, of species still existing in the Red Sea. Some of the islands are thirty feet above high-water mark; a circumstance which, he says, makes it difficult to account for the process of their formation. When a pillar of coral rises to the surface of the sea, birds, of course, resort to it; the decay of fish-bones, and other remains of their food, in time produces a soil, which is followed by vegetation, and then it quickly assumes the appearance of a little island, covered with a solid stratum of earth. But in the present case, large pieces of madrepore are found, disposed in regular layers, far above the sea; and for this no satisfactory reason can be assigned, he says, except that the sea must have retired since they were so deposited; for this tribe of animals cannot work in the air.

There is nothing more curious, my uncle ob-

served, than the changes produced on the face of the globe by the operations of the coral worm, a little creature so small as to be scarcely visible. New islands, he says, produced by its means, are continually rising out of the sea, and old ones are becoming united to others, or to the continent. In reading about something else, I met with a singular instance of this, in the account of Saugor Island, and Edmonstone's Isle, in the Bay of Bengal. Edmonstone's Isle appeared so lately as 1818; it is already two miles long, and half a mile broad, and the channel between the two islands is so shallow, that, in a few years, they will probably be joined together. Vegetation had commenced immediately on the most central and elevated part; saltwort, with one or two other plants, had given it a verdant tint, and, by daily binding the shifting sand, were contributing to form the basis of a more durable soil.

Coral was formerly thought to be a vegetable, and even the celebrated Tournefort considered it to be a marine moss; but it is now known to be the production of a race of animals, of which it seems as much a part as the shell is of the snail. Most of the islands in the South Sea are coral rocks covered with earth. My uncle says, that late voyagers have asserted that the bays and harbours of many of these islands have been observed to be gradually closing up, by the progress of these extraordinary creatures; and that

it may therefore be supposed that these separate islands will in time be connected, and actually become a continent!

He told us that M. de Peyssonnel, of Marseilles, was the first who proved by experiment the animal nature of the coral; and showed that those bodies which former naturalists had mistaken for flowers, were, in fact, the insects that inhabited the coral. When the branches were taken out of the water, these supposed flowers, which proceeded from a number of white points in the bark, withdrew and disappeared; and when the branch was restored to the water, they were again perceptible. The white specks he proved to be holes in the outer surface, or bark, and corresponding with a series of cavities within; and secondly, he showed that from these holes a milky fluid issued, which was an animal juice, and must, therefore, have proceeded from an insect. By immersing coral in strong vinegar, he could dissolve the calcareous bark to a certain depth, so as to show the tubular structure of the interior uninjured.

Carbonate of lime, my uncle says, is the principal part of the substance of the whole tribe of corals and corallines; but where these minute insects, or rather *polypi*, obtain that material, or how they can decompose such an extraordinary quantity of it from sea-water, is one of those secrets of nature which philosophers have not

yet discovered, although it is constantly in operation, and on an immense scale.

31st.—Frederick read to us this evening some of De Capell Brooke's travels, and I ran away with the book afterwards, to copy for you this account of the cataract of Trallhätta, in Norway, which must be a singular scene.

'The whole water of the Gotha tumbles with fearful roarings down the rocky declivities, and in its descent forms four principal falls, the perpendicular height of which, taken together, is 110 feet. Yet the navigation is not obstructed; for locks with sluices, like those on navigable canals, have been cut in the solid rock, with incredible pains and labour; through them, vessels can be lowered to the level of the river below the falls, preserving their course with ease, and affording a strong instance of the power and ingenuity of man.'

In conversing about Norway, my uncle said, he thought the ingenuity displayed by the Norwegian peasantry was surprising. Living remote from towns, and scattered among their mountains, they become independent of assistance. The same man is frequently his own tailor, shoemaker, and carpenter; and sometimes even his own clock and watch maker. Most of them are very expert at carving, and the beautiful whiteness of their fir-wood tempts them to make very

pretty ornaments for their cottages. They work neatly in silver, brass, and other metals; and there are few things for the purchase of which they are obliged to have recourse to the distant towns.

Their methods of brewing and baking are very simple. The first consists in a simple infusion of barley, which, with the young shoots of juniper, produces a weak but pleasant beverage.— In making their *flad bröd*, or flat bread, they mix rye-flour with water, and, when the dough is well kneaded, roll it out like a pancake, but not thicker than a wafer. As fast as they are made, they are placed on a gridiron, and one minute bakes them. Prepared in this way, the rye loses its coarse taste, and the bread is agreeable.

You will not, probably, be inclined to imitate them, but I am sure you will admire the ingenuity of these people in the manner they employ the black ants to make vinegar. These creatures have gigantic habitations, which, in size and appearance, are not very unlike the *gamme*, or hut, of the coast Laplanders. The ant-hills are five feet in height, and are composed of decayed wood, pine-leaves, and bark, mixed up with earth, and strengthened by bits of branches, which must require the efforts of a vast number to move. Streets and alleys branch off in every direction from the main entrance, which is a foot

wide; and outside, millions of the little negroes, as they are called, may be seen bustling along, heavily laden. But now for the vinegar: a bottle half full of water is plunged to the neck in one of these hills; the ants speedily creep in, and are, of course, drowned: the contents are then boiled, and a strong acid is produced, which is used for vinegar by all the inhabitants of Norlanden.

January 1, Sunday.—My uncle read to us the ‘Song of Moses,’ after the escape of the Israelites from Pharaoh and his host. He then said, as nearly as I can recollect, ‘This beautiful composition is not only a thanksgiving for their memorable deliverance, but it contains also precise prophecies of the downfall of the nations of Palestine, with the settlement of the Israelites in their room; and of the establishment of the temple on Mount Zion, with the ultimate destruction of all idolatry.

‘It is the most ancient poem now extant, and shows the early connexion which subsisted between poetry and religion: it is also a fine example of that species of composition in which the Hebrews excelled; namely, that of expressing in hymns of triumph their gratitude to God for his glorious protection.

‘“The mountain of thine inheritance” alludes to Mount Moriah, or Sion, where Moses knew

that God would fix his sanctuary; and which is prophetically spoken of here as already completed.

‘The whole army seem to have joined with one voice in this song; and Miriam and all the women re-echoed it with equal rapture; yet, while almost in the very act of expressing their gratitude, this capricious people began to murmur because there was a scarcity of water in the wilderness through which it was necessary to pass; and, because, when they did come to a spring, the water was bitter. What a beginning for the new life on which they were entering! Let us act more wisely, my dear children; and, grateful for the blessings of the past, let us endeavour to deserve their continuance through the new year on which we are entering.’

We endeavoured to trace the march of the Israelites on the map. My uncle showed us that the wilderness of Shur was a part of that great sandy desert which divides Egypt from Palestine; and which stretches from the Mediterranean to the head of the Red Sea on both sides. It is supposed by the late celebrated traveller, Burckhardt, that the place, called Marah, from the bitterness of its water, is the present Howara. Its distance from the Red Sea corresponds with the three days’ march of the Israelites; and there is a well there, of which he says, ‘the water is so bitter, that men cannot

drink it; and even camels, if not very thirsty, refuse to taste it.' Irwin, another traveller, says that, in travelling 315 miles in this desert, he met with only four springs of water.

My uncle says that Moses does not mention every place where the Israelites encamped between the Red Sea and Mount Sinai, but those only where something remarkable occurred. Elim, with its refreshing wells and shady palm-trees, must have been delightful in comparison with the desert they had passed. Dr. Shaw, who visited that country the beginning of last century, found nine of the twelve wells described in Exodus; the other three had been probably filled up by those drifts of sand which are so common in Arabia. But the palm-trees alluded to by Moses, had increased amazingly, for, instead of threescore and ten, there were then above two thousand. Under the shade of these trees he was shown the *Hammam Mousa*, or the bath of Moses, for which the inhabitants have an extraordinary veneration, as they pretend it was the exact spot where he and his family encamped. From this place the Doctor could plainly see Mount Sinai, or, as it is called in some parts of the Bible, Mount Horeb. This seems to have been the general name of the whole mountain, while Sinai was appropriated to the summit, which had three distinct elevations: on the western one, God appeared to

Moses in the bush ; the middle one, which is the highest, is that on which God gave the law to Moses, and is still called Gebel Mousa, or the Mount of Moses ; and the third, and most easterly, is called St. Catherine's Mount, from the monastery which has been erected there.

2nd.—The poor wandering gipsy died in a very few days ; and my aunt immediately put her son under the care of the Franklins and the old blind man. Charley is an intelligent little fellow, but will require great care and attention ; he speaks a sort of incomprehensible gibberish, and understands but little of what is said to him. The housekeeper asserts that nothing can civilize those gipsies, however early they are taken in hand ; but my aunt will try what mildness and steadiness can effect : she has desired him to be treated very gently, and his faults rather overlooked, till he can be made to understand the value of a good character. My uncle has written about him to some of his mother's relations ; but unless they are capable of taking care of him, he will not abandon the child. Mary and Caroline have bought some clothes for him, and as just now I have no pocket money, not having managed my last quarter well, I begged to be allowed to contribute time and work.

What an extraordinary thing it is, that these odd people, the gipsies, should have been wan-

dering in the same unsettled manner about the world for three centuries ; and always the same dishonest impostors. My aunt showed us a passage in Clarke's Travels, about the gipsies of Wallachia—where he says, though they are as well inclined to steal as the rest of their tribe, they are certainly of a more civilized nature. They are divided there into different classes : some are domestics, and are employed in the principal houses ; others work as gold finers and washers ; some travel about as itinerant smiths ; some as strolling musicians ; and others are dealers in cattle. They are skilful in finding gold, and smelt it into small ingots ; using for that purpose little low furnaces, which they blow by a portable bellows made of a buck's skin. The construction of the bellows is very simple ; an iron tube being tied into the neck of the skin, which is sewn up, and two wooden handles are fastened to the legs, by which it is worked.

I was very curious to know what could be the origin of these people, and why they have been always wandering about. My uncle told me, that ever since the beginning of the fifteenth century, when they were first noticed in Europe, the general idea has been, that they were Egyptians. It is said, that when Egypt was conquered by the Turks, several of the natives refusing to submit, revolted under one Zinganeus, and afterwards dispersed in small parties all over the world.—

From their supposed skill in magic, they were well received ; and, being joined by idlers in every country, they became so troublesome, that measures were taken to expel them from England, France, and Spain. It is a remarkable coincidence, my uncle says, that in Turkey the gipsies are called Tcheeganes ; in Italy, Zingari ; and in Germany, Zigeuner ; all which seem to be derived from the name of their first leader in Egypt : but, on the other hand, they are sometimes found wandering about in that country, apparently a distinct race from the natives, and without the least affinity to them in features, customs, or language.

Attempts have been made to prove that they have come from India ; and it is said that, near the mouth of the Indus, there is a people called Zinganes. A learned German also has traced several points of resemblance between the common language of the gipsies and the dialect of a district in Hindostan ; for instance, all words ending in *j* are feminine in both languages, and both add the article to the end of the word.

These extraordinary creatures, my uncle added, may be found in every country, from the western extremity of Europe, to the easternmost parts of Siberia ; and in all, preserve their wild, strolling habits, their filthy modes of eating, their pretended power of fortune-telling, their expertness in petty thefts, and their love of intoxication.—

In each country, too, they elect a chief, whom they dignify by some high-sounding title, such as king, count, or lord, though never very obedient to his will ; and, as one set-off against their numerous vices, they are generally extremely fond of their children.

3rd.—Mrs. P. has been here now for several days, which have been happy days to all, for she is so pleasing and gentle, and so mild, that all like her.

She told me yesterday one thing, which, though it may look like vanity to repeat, yet I know will gratify you so much, my own dear Mamma, that I cannot conceal it. She says, that she thinks me improved in many respects in the few months that have passed since I left her. ‘Very much in your manner and carriage ; and, above all,’ she added, ‘you seem to have lost the appearance of indolence that you had. I am rejoiced to see that you have acquired that power of exertion, which is so useful, both to young and old—and that you have the will, as well as the power, to conquer little habits that are disagreeable to your friends. I know,’ said she, ‘you will excuse me for saying this ; for I feel a real interest in your welfare and I have myself suffered so much from a foolish indifference to the opinion of others about what I considered trifles, that I am always pleased when I see

young people endeavour to avoid the rock on which I split.'

I could not help showing some surprise at this, for I thought it very unlike her character; and though I did not venture to express any curiosity, I suppose she saw a little in my countenance, for after some more conversation she said, that she would give me a little sketch of her life, because she thought I might derive some advantage from it.

We had not time to begin then—but I hope we shall to-morrow. In the mean time I must not forget to tell you, lest you should think I had lost all honourable principle, that I immediately informed Mrs. P. of the kind of journal which I send to you—and asked her permission to relate to you what she tells me; 'but,' said I, 'if you disapprove I will not mention it.' She replied, 'You are perfectly welcome to tell her everything—for I very much disapprove of any confidence being made to a young person that is to be concealed from her mother.'

5th.—There was a lively little discussion last night, on the want of originality in poetical ideas; and on the manner in which the same thought is repeated by one author after another; each altering it, as my uncle said, in the same way that an object is seen through glasses of different colours. Or, said my aunt, with its original strength weak-

ened by each repetition, like the successive reflections of the same object from a number of mirrors. And, though I did not venture it below stairs, you shall have my simile: like the Fata Morgana, where the objects reflected from the surface of the sea are again reflected from the clouds, but less distinct and generally inverted.

The conversation was begun by my uncle and aunt, and Mrs. P., and by degrees my cousins joined. A great distinction was made between gross plagiarism, and the borrowing a part only of an idea which the author weaves up with something new, and then places in a new light.

My aunt brought, as an example, these lines in the 'Lady of the Lake.—

The sun, awakening, through the smoky air
Of the dark city casts a sullen glance,
Rousing each caitiff to his task of care,
Of sinful man the sad inheritance;
Summoning revellers from the lagging dance,
Scaring the prowling robber in his den;
Gilding on battled tower the warder's lance;
And warning student pale to leave his pen,
And yield his drowsy eyes to the kind nurse of men.

She said, these lines seemed to have been produced, perhaps, unconsciously, by a speech of Shakspeare's Richard II.

———— Know'st thou not,
That when the searching eye of heaven is hid
Behind the globe, and lights the lower world,
Then thieves and robbers range abroad unseen,
In murders, and in outrage bloody, here;
But when from under this terrestrial ball,
He fires the proud tops of the eastern pines,

And darts his light through every guilty hole ;
Then murders, treasons, and detested sins,
The cloak of night being pluck'd from off their backs,
Stand bare and naked, trembling at themselves.

In this case they all agreed, that an author might insensibly dwell on an idea, alter, dress, and add to it, till he was no longer aware whence the original thought had come—as in a large company, a single word which happens to come to our ears from a group in another part of the room produces sometimes an interesting conversation, though none of the party engaged in it know well how it began.

Mrs. P. said that similar turns of thought and expression may be traced back through the whole chain of poets ; and that if Homer appears to be an original genius, it is because we cannot now compare him with his predecessors. Few of our old writers were less exposed to the charge of borrowing than Spenser, and yet she could not help imagining that the Persian tale of Fadlallah was the origin of those pretty stanzas in the *Faërie Queene*, where the dove who watches over Belphebe and her despairing swain, contrives that they shall once more be reconciled.

Mary said she thought it had more resemblance to the story of Camaralzaman, in the 'Arabian Nights,' who was enticed from hill to hill in pursuit of the bird who had carried off the princess's talisman. 'That cruel bird,' said she, 'leads Camaralzaman away only to separate

him from his beloved princess; but the same idea in Spenser's hands becomes a hundred times more beautiful. The dove is represented as the constant and tender companion of the youth who had long languished in grief for the loss of his Belphebe; his "dole" is soothed by the caresses and sympathy of the bird; and at last, in order to gaze at a ruby heart, which she had given him in happier times, he fastens it round its neck. Away flies the kind-hearted dove, who gains the notice of Belphebe, and gently winning her forward in pursuit of the well-known ruby, succeeds in restoring the long-parted lovers to each other.'

Mrs. P. acknowledged that Mary's opinion was more just than her own; and my aunt, looking at me, said, 'I think I see in Bertha's countenance that she has not read the Faërie Queene: suppose, Caroline, you were to refresh our recollections, and read those pretty stanzas for your cousin.'

Caroline did so; and as I know you have not Spenser among your books, and as his old-fashioned style will amuse Marianne, I will transcribe the two last stanzas, where Belphebe, attracted by her jewel, follows the benevolent bird.

She, her beholding with attentive eye,
At length did marke about her purple brest
That precious juell, which she formerly
Had knowne right well, with colourd ribbands drest:

Therewith she rose in hast, and her address
With ready hand it to have reft away ;
But the swift bird obeyd not her behest,
But swarv'd aside, and there againe did stay ;
She followed her, and thought againe it to assay.

And ever when she nigh approcht, the dove
Would flit a little forward, and then stay
Till she drew neare, and then againe remove ;
So tempting still her to pursue the prey,
And still from her escaping soft away ;
Till that at length into that forrest wide
She drew her far, and led with slow delay ;
In th' end she her unto that place did guide
Whereat that woful man in languor did abide.

7th.—My curiosity about frost has been gratified. Each of the last three nights the thermometer has been below the freezing point—last night it was 28°. The ground is hard, and grass, trees, and shrubs, are quite white. Nothing can be more beautiful—each blade of grass sparkling with gems, every branch and spray covered with delicate crystals, and the leaves of the fir-trees hanging like little miniature icicles.

I asked my uncle where the frost comes from. 'It is in fact,' said he, 'frozen dew; when the ground is cooled down to 32°, the dew deposited on it is congealed, and becomes hoar frost. This often happens when the temperature of the atmosphere is much higher; and I have seen a copious hoar frost in a clear calm night, though the air was not colder than 40°.'

When I begged my uncle to explain that, he told me that, from the satisfactory observations

of Dr. Wells, it appears that the heat which the earth receives from the sun in the day is returned or *radiated* back again from the earth during the night, and is dispersed in the sky; the surface of the earth thus becomes cold from its sudden loss of heat, and congeals the dew. The cold produced by this radiation of heat from the earth, is always less if any substance be interposed between it and the sky; not only a solid body, but even a fog, or clouds have this effect, because they intercept the heat, and, perhaps, again send back a portion of it to the earth; and this, he added, is the reason why a bright clear night is generally colder than a cloudy night.

I asked my uncle if that was also the reason that such light substances as straw or mats are found to protect tender plants from cold?

‘Yes,’ said he; ‘I used to wonder how such thin, open things as Russia mats could prevent plants from becoming of the same temperature as the atmosphere; but when I learned that all bodies at night gave out their heat by radiating it, unless some covering be interposed, which acts, not by keeping out the cold, but by preventing their heat from flying off, then I perceived the reason of what before had appeared to me to be almost useless.’

He described several experiments he had tried to satisfy himself on this subject. He found that even a cambric handkerchief was sufficient;

and that when raised a few inches in the air, the warmth of the grass beneath was 3° greater than that of a neighbouring piece of grass which was sheltered by a similar handkerchief actually in contact with it. All his experiments confirmed those of Dr. Wells, and showed that by placing substances for the shelter of plants, not directly touching them, the effect was increased. Snow acts in the same manner as a preservative of plants when the ground is not already frozen.

Some other experiments my uncle then described, and he endeavoured to make me understand Dr. Wells's general opinions on the formation of dew. He also mentioned the curious method they have in India of forming artificial ice in earthenware-pans, where the temperature of the air is even 12 or 14° above the freezing point. He concluded by saying, 'I do not tell you all these particulars, Bertha, merely to stuff your memory with philosophical shreds and patches, but to excite your mind to observation and inquiry, which is a hundred times more useful.'

8th, Sunday.—The *Ephod* being mentioned in a part of the Scripture I was reading this morning, I asked my uncle to describe it, for I had but a confused idea of the dress of the high-priest. He says the name is derived from a Hebrew word, signifying *to tie*. It was made

of linen, and brought from behind the back over each shoulder; and then crossing the breast, it was passed round the waist so as to form a girdle; the two ends hanging down before. The *Breast-plate of Judgment*, which was so called because the high-priest wore it only when he went to consult the Divine Majesty, was made of the same materials as the ephod; and being two spans in length by one in breadth, it formed a square when doubled. The span, he says, was half a cubit, or about ten inches.

I then begged of my uncle to explain the nature of the *Urim* and *Thummim*. He told me that the words signify *light* and *perfection*; but as Moses does not appear to have received directions for making them, it is impossible now to form any distinct idea of the materials of which those sacred ornaments were composed, or of the manner in which they were employed, in order to obtain answers from the mercy-seat in the Tabernacle. The opinions of the learned have therefore been very various on those points: the Jews think they consisted of precious stones, which were so arranged that the partial brilliancy of certain characters engraved on them pointed out the required reply. Others suppose that they were merely parts of the grand dress, which qualified the high-priest to present himself in the holy place on great occasions. But the question is of little importance to us; like many

other mysteries attending the Divine ordinances, we vainly endeavour to penetrate their meaning: we may, however, feel assured, Bertha, that if it were necessary that these things should be understood by us, they would have been fully explained. Many ceremonies in the ritual given to the Israelites, were adapted to them as a people who had lived amongst the heathens, and who had imbibed those prejudices and depravities of heathen worship, which were so totally removed from every thing spiritual. To us they may be objects of rational curiosity; but a knowledge of their use or precise fabric could add no essential testimony to the well-established truths of Scripture History.

‘There is, however, one mode of viewing the subject, from which we may derive a useful hint: the high priest could not address the Almighty when divested of this emblem of light and perfection; in like manner our addresses to God will be of no use, unless we also are adorned, not indeed with the *emblem* of light, but with the true light of the Gospel; with that clear and bright faith which makes us feel the power and goodness of Him to whom we pray.’

9th.—The beautiful hoar-frost at first gave to every twig and blade of grass the modest, quiet appearance of a wreath of pearls; but last night there was a slight shower of rain, and now

every thing is glittering like diamonds. We observed, also, another peculiarly pretty circumstance : the wet being immediately frozen, every thing was enveloped with thin transparent ice, through which the leaves, and berries, and branches, were distinctly seen.

Every shrub, and every blade of grass,
And every pointed thorn seem'd wrought in glass ;
In pearls and rubies rich the hawthorns show,
While through the ice the crimson berries glow.

Already the birds are become tame, and many venture courageously to take crumbs off the window-stones. Poor little birds, this bright clear air, and sunshine, make every body else look gay, while they sit shivering or sadly chirping on the trees ; even the hens and ducks look swelled and melancholy.

We walked to-day to Franklin's farm, and found him taking advantage of the hardened ground, to put out manure ; he had two carts employed, and all the people seemed trying to keep themselves warm by hard work.

The field which had been left to remain *fallow*, will be much improved by this frost, he says. It was a coarse, wet soil, full of lumps of heavy clay ; and he showed us how much these lumps were already broken. My uncle said that the soil being thus divided, and pulverised, would be greatly meliorated ; so, as we walked home, I asked him why the lumps of wet clay were

broken by frost, which I thought would only have hardened them the more, like the road on which we were walking.

‘ The reason why the clods of wet earth are burst by the frost, is, that the water which they contain becomes ice ; and, in doing so, it swells, and therefore requires greater space than while it was water. In the process of freezing, water crystallizes, and every crystal drives away the adjacent particles which interfere with its exact formation. This does not happen to hard roads, such as we are now walking upon, because they are closely *bound*, and do not admit the previous entrance of the moisture ; but if the road was soft and spongy, you would then probably see, in its rough and uneven face, the effect of the frozen water. When we return home, if you look at the piece of gravel walk which was lately made, and is not, therefore, yet bound, you will observe what a curious appearance the frost gives it : the larger stones, which by their weight prevented the water from spreading under them, will appear sunk ; while the sandy, spongy part which imbibed the rain, is swelled by the frost, and raises the surface of the walk. All crystals have a regular form, and in assuming it, they are obliged to recede a little from each other ; each crystal, it is true, has but little power, but as their number is almost infinite, their combined power is so great, that what is called in military

language a *shell*, that is, a hollow ball of strong cast iron, if filled with water, and the aperture well secured, will burst when the water freezes. When such is the expansive power excited by water as it passes into the state of ice, we cannot be surprised that jugs and bottles of water are frequently broken in a frosty night—and that water pipes constantly burst when the frost penetrates to them.'

10th.—The frost was so great last night, that it caused sad mischief. The thermometer sunk to 24°. Mary had two nice hyacinths in bottles; unfortunately, she placed them yesterday in a window where there was a bright sunshine; Frederick having promised to put them back safely in the latter part of the day. He forgot them; but as soon as he woke this morning, he went to repair his error—when, to his great dismay, he found the glasses burst, and the water become lumps of ice.

He went to Mary, but he was so sorry for his negligence, that she could not reproach him. The only thing to be done, she said, is now to consider how to relieve the bulbs from the ice that surrounds them. Frederick proposed placing them near the fire, that the heat might thaw the ice; but Mary told him that she was afraid the sudden change from cold to heat would make the bulbs decay—and that the best plan, she

thought, was to put them into cold water. Mary had called me to look at the glasses on the first discovery of the misfortune ; and we carried them and the bulbs inclosed in ice to my uncle, who had just come down to the library, to consult him on what was best to be done. He approved of Mary's proposal, and said, ' That is a practical instance of the advantage of acquiring different kinds of knowledge.' Mary had concluded, that the sudden change of temperature would produce immediate decay in the roots—on the same principle that heat, applied to people who have been frost-bitten, causes mortification in the frozen part. My uncle afterwards told me, that the same thing happens to the frozen buds of tender plants, which are exposed to the rays of a hot sun before the frost has been dispersed ; while those which are gradually thawed receive no injury.

I reminded him of his having spoken of *crystals* of ice, and asked how that term could be applied to anything but mineral bodies.

' The term crystal,' he replied, ' came from the Greek word for ice—it was afterwards applied to rock crystal, which the ancients imagined to be water converted into stone ; but it now signifies the regular figure in which the particles of any substance arrange themselves in passing from the liquid to the solid state.—Each of those substances has a figure for its crystal peculiar to

itself, and from which it never varies. Common salt, for instance, dissolved in water, and slowly evaporated, always forms regular *cubic* crystals of about an eighth of an inch in diameter, and quite transparent; sugar candy is nothing but sugar crystallized into *six-sided* prisms; and alum forms itself into beautiful crystals of *eight* sides. All this you may easily ascertain for yourself by experiment; and when I have an opportunity of taking you to a smelting house, you will see that in the cooling of melted metals, each metal assumes a crystalline shape belonging to itself.'

I asked how, and when, all the crystals and precious stones and salts in the world could ever have been in a fluid state.

'One thing at a time,' said my uncle: 'that question would lead us quite away from ice. I was going to tell you, that water, in the same manner as salt or metals, when it ceases to be fluid, which happens at the temperature of 32° of Fahrenheit's thermometer, assumes a constant regular form. Now, Bertha,' he said, 'examine this lump of ice, which was in the broken glass, both with and without your magnifying glass—and tell me how it appears.'

I told him, that to my naked eye it seemed as if there were lines crossing and recrossing one another in an uneven manner; but that, with the glass, it appeared like a collection of little

spears with pointed ends, laid very closely together and mostly darting from the places where the ice had touched either the bulb or the side of the glass vessel.

'Yes,' said my uncle, 'that is what I wished you to observe;—when ice begins to form on the surface of water, several of those spear-shaped *spicula* shoot from the edge of whatever contains the water, or from any solid body which happens to be in the water,—a bit of wood or even a straw.'

I interrupted my uncle to beg he would explain the word *spicula*—I know he is never displeased at being interrupted by a question of that sort.

He told me that *spiculum* is a Latin word, and means a dart or an arrow, or sometimes the sting of a bee,—*spicula* is the plural, and is commonly used in English to express any small pointed bodies.

'To return to the ice,' said he: 'that first set of *spicula* serve as bases for a new set, and these again for others; each single *spiculum* diverges or spreads from its own base at an angle of nearly 60° , and therefore they all cross each other in an infinite variety of directions, and this process continues till one even sheet of ice is formed.' I asked my uncle, if the reason why the ice occupies more space than the water was, that those *spicula* or crystals, from their shape,

and from shooting in various directions, cannot lie so closely together as the minute particles of water.

‘Yes,’ said he, ‘you are perfectly right—a proof of this is, that it requires great power to compress water in the smallest degree; while the hardest ice, if pounded, may be easily forced into a smaller space.’

We all again examined the formation of the ice in the broken glasses, and I saw the pretty little spicula quite distinctly—we then went to breakfast, leaving the bulbs to thaw quietly in their cold bath.

11th.—After the hyacinth roots were thawed yesterday, they were placed in a warm room; and we had a great deal of conversation about the different effects of heat and cold, according to the different bodies that are exposed to them. I learned that extreme heat is necessary to liquefy steel, platina, or porcelain; some metals require far less, and Mrs. P. says she once bought in a toy-shop, some spoons made of bismuth, tin, and lead, which melted in a cup of hot tea. The warmth of the skin is sufficient to thaw frozen water. On the other hand, the degree of cold requisite to render mercury solid is very great, while that which forms ice is moderate.

Among vegetables, there are many which resist the strongest frost, and the native trees here

have their stems very seldom injured. Most of the herbaceous plants lose their stalks, though their roots remain alive ; and some revive at the return of spring, even after their roots have been frozen.

, Ants and flies, and many other insects, fall asleep in a very slight degree of cold.—Dormice, also, and other animals of the same class, appear as if life was suspended for several months during cold weather, so much so that their hearts cease to beat. The snail and the toad undergo the same stupefying effect, and serpents can be frozen so as to become brittle ; if they are broken in that state, they die ; but if left in their holes, into which the warmth of spring penetrates slowly, they recover.—It is in the season when their food begins to fail, and the fruits which fatten them disappear, that these creatures conceal themselves, in order to submit to this wise law of nature. Those that are deprived of food by the snow covering the ground, sleep till it melts. The white bear lives on the sea-shore in summer, and on islands of ice in autumn, and he does not fall asleep till the ice, being thickened and raised too high above the water, is no longer the resort of his chief prey—the seal. His means of obtaining food continuing longer, a much severer cold is requisite to deaden in him the call of seeking it, than in the black bear who devours vegetables ; or than in the brown bear, who lives

on animals who retire earlier than he does.—That hunger should thus give way to sleep, when the cold which benumbs them would starve them by famine, appears ordered by that benevolent Providence, who regulates every part of the universe.

My uncle says that something like this is the case in man ; when the cold is very violent he becomes insensible ; if one of his limbs should freeze he does not perceive it, but, on the contrary, fancies himself growing warmer, and feels such a propensity to sleep, that he is angry at being roused. There are continual instances of this in the northern parts of Europe ; and the poor frozen person, if indulged by his companions in closing his eyes for a few minutes, seldom opens them again. He does not, however, die immediately, my uncle says : it is even thought, by some, that as long as the same temperature continued, he would sleep, like the dormouse, deprived of all vital action.

My aunt said, she wondered whether human creatures could be revived, after having been many days frozen, provided similar means were used for their recovery that are employed to restore a frozen limb. Warmth, she said, is applied with the utmost caution, the frozen parts are rubbed with snow, and then immersed in water very little warmer than melted ice. The attempt would be worth making, instead of abandoning frozen people to their fate, she thought ; but that

as to having the power of sleeping like a dormouse or a bear, to whom Providence gives that habit, because they have no means of procuring food, she could not believe that possible. 'Man has so many resources, that it was evidently unnecessary to endow him with the capability for sleeping away hunger; but I really believe,' she added, 'that there are people of such inveterate indolence, that they would sleep for several months, to relieve themselves from all care, if they had the power of voluntary torpidity.'

My uncle replied, that doubts have been expressed whether it was in any case a voluntary power: it is asserted that animals never yield to torpidity till driven to it by necessity; and that many of those lethargic animals, while existing during winter on their accumulated fat, which is gradually absorbed into the system, retain the use of their faculties. The cricket is one proof that animals do not submit to it from choice. This insect passes the hottest part of summer in crevices of walls and heaps of rubbish; about the end of August it quits its summer dwelling, and endeavours to establish itself by the fireside, where the comforts of a warm hearth secure it from torpidity. He then mentioned a colony of crickets which had taken up their abode in a kitchen, where the fire was discontinued from November to June, except one day every six

weeks. On these days they were tempted from their hiding place, and continued to skip about and chirp till the following morning, when they again disappeared in consequence of the returning cold. This fact, which he was told by an ingenious friend, shews that in crickets at least torpidity depends on circumstances; and perhaps other sleeping animals, he says, have the same accommodating faculties.

Mrs. P. amused us with some very extraordinary accounts of toads that have been found in the stems of old trees, so that the wood must have grown round them; and even in cavities of stones without the smallest crack or aperture for any communication with the air. My uncle told her that an experiment had not long ago been tried at Paris on that curious subject: a living toad was enclosed in plaster, and at the end of six months it was alive and strong; but some one having suggested that plaster of Paris, when dry, is more or less porous, the same experiment has been repeated with the addition of a coat of varnish to prevent the admission of air.

Before we separated, my uncle promised to procure for me, if possible, a torpid dormouse.

12th.—You must allow, Mamma, that my journal never detains you very long on any one subject: from polar bears and frozen limbs, we must now skip to tobacco plantations and the

West Indies, where you know Mrs. P. resided some time. .

My uncle was inquiring from her this evening about the different modes of culture and the proper soil for tobacco. Few plants, she says, are so much affected by situation; it acquires such different qualities from the soil, that tobacco plants which have been raised in one district, if transplanted into another, though not a quarter of a mile distant, will entirely change their flavour. For instance: the Macabau snuff is made from the leaves of a tobacco plant which takes its name from the parish of Macabau in St. Kitt's, and there only the real snuff of that name can be prepared. Both plants and seed have been tried in all parts of that island, and in several of the other islands too, but the peculiar scent has not in any instance been retained.

The tobacco of St. Thomas has also a particular smell, which the produce of no other island resembles. It is a curious circumstance that none of it is manufactured there; it is all sent to Copenhagen, and is returned from thence to St. Thomas, and made into snuff. In Barbadoes they make the highly-scented rose-snuff, which is sometimes imitated in London, by adding attar of rose to fine rapee; but in the island it is made by grating into the snuff a fruit called the rose-apple, which is cultivated for that purpose. It is, however, neither a rose nor an

apple, though, when ripe, it somewhat resembles a crab-apple ; but it has a stone within, and has at all times a delightful fragrance like the rose. The fruit, when ripe, is gathered, and carefully dried in the shade.

But what interested me much more than all her snuff and tobacco, was the account she gave of some dear little green humming-birds, that used constantly to build amongst the flowers of a convolvulus that grew against the house near her window. She took the greatest pleasure in listening to their little feeble notes, and in watching their rapid motions and all their habits. They were of a smaller species than any of our little Brazilian beauties ; and she says the eggs were actually just the size of coriander seeds !

14th.—As I was curious to see the effect of frost on a very wet soil, Frederick and I went this morning to a spot in the low fields, where we knew it was always swampy. We observed that, as we walked there, the ground crackled, and sunk a little beneath our feet ; so Frederick went for a spade, and we gently raised up one of the large lumps between two of the cracks. We found very near the surface a thin crust of ice, and under that a forest of minute columns of ice, standing close together like a fairy palace, with rows in it of clustered pillars ; for each column was in reality composed of several lesser

ones, not thicker than large pins. You cannot think, Mamma, how pretty they were.

When we raised one of these cluster columns with its capital of earth, it separated quite easily from the ground beneath it; but still a thin film of earth remained sticking to the bottom of the column. Frederick brought home a lump of these icy pillars on the spade, and my uncle laid aside his letters, to shew, he said, how much pleasure he felt when he saw us in pursuit of knowledge. As soon as he looked at our pillars, he said, 'In that sort of spongy soil where you found them, these icy crystals are formed so immediately under the surface, that only a thin crust of earth remains over their tops; and the film of clay, which sticks to the bottom of the column, shews you that the frost has not penetrated below it, but that the earth beneath continues soft. I see you are looking at those marks across the pillars; break the column at one of the marks.'

I did break one, and found exactly such a film of earth between the two parts of the column, as that which was on the bottom of it. I asked how could earth get into the middle of the crystal?

'Each division,' said my uncle, 'shews a separate crystal—each crystal was formed in one night,—and the number of joints or interruptions in the column shew how many nights we have had frost.'

I reckoned four divisions in each column; the

uppermost was the longest, the next shorter, and so on ; and I pointed out that circumstance to my uncle.

‘ That,’ said he, ‘ is easily accounted for ; whatever quantity of moisture there was in the ground at first, there must have been less and less every succeeding night, and the length of the columns therefore diminished each night in the same proportion.’

In a short walk that we afterwards took with my uncle, he observed, as we passed the garden of a small cottage on the border of the forest, that it was late to see carrots still in the ground ; and Frederick remarked that the earth looked cracked and swelled around them. My uncle asked leave of the cottager to go into the garden, and there we found that several carrots were actually pushed upwards by the icy columns, the tops of which adhered to the crown of the plant, from which the leaves spring. As the additional joints of the columns had formed, they had acted with so much force, as, in some cases, to break the small fibres by which the root is held in the ground ; and in others even the end of the tap root of the carrot was snapped asunder.

I took an opportunity of asking my uncle if there are any spicula in an icicle, which looks so transparent and smooth.

He explained to me, that an icicle assumes its smooth conical form from the gradual con-

gealing of the water as it flows down the surface of the icicle. When broken across, he showed me that it was somewhat radiated in the structure, as if the spicula arranged themselves round the axis; and he added that, if I examined a flake of snow, I might see the same appearance.

I next asked him (indeed he is very patient) if it is the shooting of these spicula that causes the beautiful appearance of leaves and flowers on the windows: he said, yes. But why then are the shapes of the leaves so very various?

'On a calm night,' he replied, 'only a close, even net-work is formed; but the least current of air whirls the moisture into an amusing variety of forms. That icy foliage is generally within-side the window, because our breath contains much moist vapour; and as no room that has doors, windows, and chimnies, can be without partial drafts of air, so the spicula are urged together in one place, and irregularly checked in another.'

15th, Sunday.—Frederick asked my uncle this morning, why the work of the tabernacle was so minutely described in the Bible.

'It is supposed,' he replied, 'that Moses has been thus exact in relating how the tabernacle was made, in order to show that all was done according to God's directions, detailed in the preceding chapters; and it is therefore that

Moses so frequently repeats the expression "as the Lord commanded."

' In reading the account of the Jewish tabernacle, as well as of the various ceremonies of the law, we should always consider for what ends God was pleased to ordain those things. St. Paul informs us that the Jewish law was an imperfect dispensation from the first, and added, that, though it was adapted to the weakness of the Jews, its several institutions were intended to typify the more perfect dispensation of the Gospel. Thus, the Jewish high priest was a manifest type of our Saviour; and the ark in the Holy of Holies, with its mercy-seat, from whence God communicated his will, was an emblem of Him from whose mouth we afterwards received the perfect law.

' The religious services ordained were *sacrifices* of different kinds, and various *purifications*. All these apparently burdensome rites were, however, aptly significant of many things tending to preserve an inward, true religion; such as the constant acknowledgment that all the blessings we enjoy are the direct gifts of God; 2dly, the feelings of reverence due to his temple, and to all the things appropriated to his service; 3dly, the necessity of curbing our passions, and of atoning for past errors; and further, the impossibility of rooting out our evil habits without

vigorous exertions. These and other moral objects of the same nature, were well understood by the Israelites to be specifically represented in the ceremonial law.

'There were, also, certain solemn *festivals* ordained as commemorations of signal national mercies and deliverances. Nothing could have been better calculated to keep alive the spirit of gratitude to the bountiful Author of those mercies; and that nothing could be more consistent with the feelings of the human mind, has been exemplified by the practice of every age and nation, in the anniversary observances of religious, national, and domestic events.'

16th.—The frost still continues; and, instead of being miserably cold, as I expected, I almost enjoy it. There is not much wind, and the air feels dry and clear. We take long quick walks in the bright part of the day, while the sun shines. The rooms are very comfortable, and I find, as my aunt told me, that I am less chilly when I stay at a moderate distance, than when I sit quite close to the fire. In the latter part of the day, if we begin to grow cold, after the glow of warmth produced by walking is gone, we take some good house exercise, and that always brings it back.

Frederick asked my uncle to-day, whether it

is by the loosening of the earth round the roots of plants, as we saw last Saturday had happened to the carrots, that frost kills them?

‘Perhaps,’ said he, ‘that may have some injurious effect upon tender plants; but it is by bursting the sap vessels that frost does the most mischief.’

‘I suppose the sap freezes, and that its expansion bursts the vessels,’ I said.

‘Just so,’ replied my uncle; this frequently occurs, even in moderate frosts, to tender plants, especially if they are succulent. But in very severe winters, even forest trees have suffered. In the great frost of 1739 and 1740, the largest branches were split from end to end, and numbers of the most hardy trees died in consequence.’

All this made me very anxious about my garden and my nice plants; I had already put stable litter on them; and I asked my uncle, if that should be frozen through, what he would recommend me to do.

He advised me to bend some long withies of sallow over them, so as to leave a small space above the surface of the litter, and over the sallows to spread either a mat or fir boughs; and he reminded me that he had explained, some days ago, the use of this process.

‘Besides,’ said Mary, ‘I believe the stillness of the air under the covering helps to delay

the freezing of the moisture in the ground. I recollect that the winter before last, which was very severe, Mamma had fir-branches hung on the wall to cover her tender climbing plants, and long stiff straw or fern was lightly strewed round their roots, and they all lived through the winter, and looked healthy and beautiful in summer.'

My uncle told me, for my satisfaction, that a long frost, if not very intense, is less injurious to tender plants, than a milder season in which soft weather and frost alternate: in open weather there is a tendency in the sap to rise; and if it is checked by succeeding cold, the sap-vessels are injured, and the plant becomes sickly, or decays.

'Is that,' said Frederick, 'the reason why spring frosts are more hurtful than those of winter?'

'That is the principal reason; but you must also consider that the ground, during the previous summer, had absorbed a great quantity of heat, which helps to mitigate the winter's cold: this has been all expended before spring, and, therefore, the whole force of the cold is then felt.'

Frederick said he remembered hearing Mr. Grant mention last autumn that all the potatoes had been injured by frost in Alney Valley, near Gloucester, while those on the side of the hill had quite escaped; and, as he thought valleys

must be warmer than hills, he begged of my uncle to explain the cause.

‘Valleys,’ he was answered, ‘are more sheltered from the wind, and the air in them is undoubtedly hotter in the day-time than that on exposed high grounds. But in autumn, when the nights become cold, and slight frosts occur on the sides of the hills, the air that is cooled there being heavier than warm air, sinks down into the lower grounds, displaces the warm air, which rises, and accumulates in the bottom of the valley.

‘There is another reason why, on clear nights at least, the cold is more severe in low, confined places that are sheltered from the wind. The radiation of heat into the sky, which I lately explained to you, reduces their temperature below that of the air, except what is in immediate contact with them; and there being no wind, there can be no circulation of the warmer air, to replace the heat they have lost.

17th.—Hamlet was mentioned yesterday after dinner; a great deal was said about it, and many different opinions were expressed. At last, to my great vexation, my uncle observed that I took no part in the conversation.

‘Come, my little Bertha, we must have your opinion, pro or con; are you one of those who

overlook the merits to mark the faults? Tell me what you think.'

This direct question of my uncle's was really terrible ; every one was silent ; and I was obliged to acknowledge that I had only read Hamlet once, not having felt as much interest in it, as in many other tragedies of Shakspeare. 'There was something which appeared to me a little confused in the whole plot—the ghost, too, disappointed me ; and Hamlet seemed unnecessarily unkind to poor Ophelia—and, in short, I did not very much like the play, perhaps because I did not understand it.

My uncle praised me for having courage to express honestly what I thought ; and he said he would read the play to us, that I might enter into the spirit of it while the conversation was fresh in my recollection. He had taken but little part in the conversation, his object being rather to draw out all our opinions, than to influence them by his own ; but as he was going to begin, he said, ' It appears to me that Hamlet is not quite suited to very young people ; it scarcely comes within the range of their views of the human mind. One of the earliest critics on Shakspeare remarked, that Hamlet " can only please the wiser sort ;" and I will therefore endeavour, by a few hints, to direct your attention to the main object of the play, and to one

or two objects most worth noticing. Unless young people learn how to see and think for themselves, liking or disliking becomes the mere effects of caprice or fashion.

‘ In this play, Bertha, the object of chief interest is not the plot, nor even the events—it is character. The reader easily anticipates the story, and feels no great suspense as to the fate of the king or queen ; and though our love of justice naturally makes us rejoice in the punishment of vice, almost all our feelings are absorbed by the character of Hamlet—the impulses of his noble mind, and the indignation he feels at unexpected wickedness.

‘ The passions of the various persons in this drama are displayed with equal truth and strength. Hamlet’s grief and horror at the death of his father, and at his mother’s baseness, are beautifully and naturally expressed. He feels as a virtuous and honourable man, but he feels also as a son ; and in those contending feelings lie the great interest of the piece. Even in the utmost vehemence of his indignation, his manner of treating his mother is remarkable ; and, as some writer has observed, it is that which chiefly distinguishes his character from that of Orestes, and shews indeed, in the difference between those two heroes, the opposite principles of the Christian and the heathen authors.

' As to his madness, you may perceive that it was feigned in order to prevent all suspicion, on the part of the king, of the enterprise he was engaged in ; and to confirm that idea, he affects a severity of conduct towards Ophelia, in direct opposition to his former sentiments. In the distracted state of his mind, he could not possibly explain to her the cause of his suspended affection. His pleasure was to think, not to act ; and all his principles of action were unhinged by the harassing scene around him. Though he contrived the scene in the play to prove the truth of the ghost's suggestions, yet he appears to rest satisfied with the confirmation of his suspicions, and declines to act upon them. But, though his character does not shew strength of will, it is everywhere marked by quick sensibility, and refinement of thought.

' The other characters have also great merit. Ophelia is beautifully painted ; her love, her madness, and her death, are described with the truest touches of tenderness and pathos. Polonius is an excellent representation of a large class of men, who talk wisely and act foolishly. The advice he gives his son is sensible, while that to the king and queen respecting Hamlet's madness is ridiculous ; but the one is the sincere advice of a father, the other that of a meddling and officious courtier ; and throughout this part Shakspeare keeps up the nice distinctions

between the understanding, the habits, and the motives of mankind.

‘The plot of this play may be, as Bertha says, confused, and the catastrophe, as Johnson tells us, not very happily produced by the awkward exchange of weapons; but if you study it as a display of character, you will discover fresh beauties every time you read it; you will perceive that it is of a higher order of dramatic paintings than many of Shakspeare’s more popular works, and that it abounds in the most eloquent and striking reflections on human life.’

18th.—The Lumleys arrived yesterday, my aunt having invited them to meet Mrs. P. I feel very glad, indeed, to see them again, and I am not this time out of humour at interruption from visitors.

We amused ourselves part of yesterday evening with *story play*, which I had never heard of before. You are to whisper a *word*, which must be a substantive, to the person who begins the play, and who is to tell a short story or anecdote, into which that word is to be frequently introduced. It requires some ingenuity to relate the story in so natural a manner, that the word shall not be too evident, and yet that it may be sufficiently marked. When the story is finished, each of the party endeavours to guess

the word, and the person who discovers it tells the next story. I will give you a sample.

It was decided that my aunt should begin; Frederick whispered the word; and she began so naturally about a visit from Mr. Arthur Maude, who has just returned from Italy, that, at first, I thought she was not going to join in the play.

'Mr. Maude tells me,' continued my aunt, 'that he has been greatly interested by the Vaudois, and well repaid by seeing those amiable people, for the fatigue of making that part of his tour on foot.

'In a beautiful valley between Pignerola and La Tour, he observed a small open arch, under a group of oak trees, that stood on a round green knoll. He afterwards learned that this arch had been erected about the time that the poor Vaudois had been obliged to quit their native hills, under the brave and pious Arnaud. It was ornamented with figures of saints, and had such an uncommon appearance among those wild valleys, that he sat down to make a sketch, not only of the arch, but of the picturesque scene which surrounded it. Twice he began, and twice he was interrupted by sounds of distress, which seemed to come from within the arch. On approaching it, he found a young creature about fifteen, seated under the shade

of the arch, and plying her distaff diligently, while the tears fell from her eyes. In reply to his inquiries as to the cause of her grief, she timidly told him, that her poor old father had been so ill that he could earn nothing for many weeks; and having already been reduced to sell everything but his house, he was totally unable to pay one of the heavy taxes which was now demanded from him. She had, therefore, been spinning—spinning—for ever with her distaff, but all in vain; her yarn was not ready, they must pay the tax without delay, and to do so she must part with the only treasure she possessed;—that was the cause of her sorrow; and she had retired to that little arch to avoid the sun, and to conceal her tears from her father.

‘ “ For that one thing, I can get money enough,” said she, “ but how can I part with it! It was once the Bible of Henri Arnaud; my grandmother gave it to me, saying, ‘ Never, never part with this precious book, Janetta.’ But, what can I do?”—and her tears burst out afresh, “ I *must* sell Henri Arnaud’s Bible, or my father will have no house to shelter him!”

‘ Mr. Maude asked her to guide him to her father’s cottage. She took him by a winding path which led from the arch, to a very poor little chalet, overhung by chesnut trees. The old man was seated on a bench at his door; and

Mr. Maude, placing himself at his side, and entering into conversation, observed how much his pale countenance brightened at the interest with which a stranger listened to his anecdotes of Henri Arnaud. Mr. Maude indulged himself by giving a small sum, which was sufficient to pay the tax. And having thus enabled the little Janetta to keep her valued Bible, he returned, I am sure, with a happy mind, to finish his sketch of the picturesque *Arch*.'

Mary readily guessed that word, and my aunt therefore whispered one to her. After considering for a moment, she proceeded—'The Alpine Marmot, you know, is one of those animals that pass a portion of the year in a torpid state. It delights in cold, mountainous regions, where it burrows in the ground, and prepares its wintry residence with great art, lining it with the finest grass. To collect this grass, the whole family, it is said, act in concert; some are employed as sentinels, to give notice of approaching danger; others cut it; and when a sufficient quantity is gathered, one of them acts the part of a waggon, to carry it home. This marmot lays himself on his back, stretches his legs upward, and suffers himself to be loaded just like a waggon of hay. One set then take hold of him by the tail, and drag him along on his back; while another set act as guides, to prevent accidents, or to remove any roughness in

the path, which might overturn their little living waggon.'

My uncle having rightly guessed the waggon, he was next called before the house ; Mary first giving him his text-word.

' I would readily gratify with a tale all the friends collected here to be amused ; but, alas ! not having been gifted with invention, by the fairy presiding at my birth, I can offer you nothing but an historical fact : I can vouch, however, for its fidelity, as I had it from the lips of the person to whom it occurred.

' When Sir Charles W. was ambassador at the court of St. Petersburg, he found that the intrigues of a party in the Russian cabinet were all directed against our interests ; and, with his usual promptness, he wrote despatches to communicate the circumstance to his own government. These despatches were treacherously obtained by the Russians ; but as they were found to be in a secret cipher, they were incomprehensible. By the most culpable want of fidelity, however, in some of Sir Charles's household, it was discovered that the *key* to this cipher was pasted on a screen, which he kept carefully locked up in a closet, within his own bed-room ; yet, in spite of this precaution, some artful person contrived to get in there, and was thus enabled to decipher his despatches.

' The following night, he was awakened by his

friend, General Rostopchin, who, with the courage and fidelity of real friendship, risked everything to warn him of his danger.

“Fly, my friend,” he exclaimed, “your despatches have been read—the council is now sitting, and it is resolved that you shall be seized and sent to Siberia. Every moment’s delay increases your danger. I have prepared everything for your escape; the British fleet is off Cronstadt, and now only can you get on board.”

‘The friendship of this generous Russian had even triumphed over the fidelity which he owed his own sovereign. But Sir Charles, though full of gratitude, refused to take his advice.

“I am here,” said he, “as the representative of the British King; and never can I so forget his Majesty’s dignity, as to fly from danger. They may send me to Siberia, at their peril; but I never will voluntarily quit my post. I will immediately appear at the council, and assume my place as the ambassador of England.”

‘With the utmost expedition he arose, and prepared to appear at the Russian council; but with a presence of mind like Lord Nelson’s, when he waited to seal his letter with wax, that it might not appear written with precipitation, Sir Charles dressed himself with the utmost precision, in full court dress, to show that he felt perfectly at ease. When he entered the council

chamber, all his enemies seemed to shrink—no one ventured to intercept him as he advanced to the Empress. She received him graciously, and, extending her hand to him, looked contemptuously at those around her, saying, “I wish I might possess such a minister as this British ambassador; on him, indeed, his master can justly rely for courage and fidelity.”

Wentworth guessed the particular word in this interesting anecdote; and a new one having been whispered to him, he begged leave to tell us a traveller's story:—

‘Mr. Scouler, in his voyage up the Columbian river, came to a curious rocky hill, called Mount Coffin by Captain Vancouver. These rocks appeared to be the burial place for the natives of an extensive district; from dread, as well as respect, the Indians are in the habit of depositing their dead at a considerable distance from their dwellings. The bodies were placed on the rocks in canoes, which served as coffins, and which were covered by boards and secured by great stones. Into these canoes, or more properly speaking coffins, their disinterested relations, unlike hungry heirs in more civilised countries, had crammed all the valuable property of the deceased. Mr. Scouler mentions as a remarkable circumstance, that a large serpent, which you know is the emblem of immortality, issued from one of the coffins, as if to warn off all in-

truders from that sacred spot. Perhaps,' continued Wentworth, 'the Indians have some confused idea of the river Styx, and think their deceased friends will be the more readily ferried over to paradise from being placed in a canoe instead of a coffin.'

Mr. Lumley was very much pleased with the manner in which Wentworth had performed his part, and having of course guessed the coffin, he was next brought forward.

'My mother,' he said, 'had a dream soon after I was born, which she afterwards told me, and which still remains fresh in my memory. She imagined that an angel appeared and told her that her new-born son might possess all the qualities of both heart and understanding for which she had so ardently prayed; "but," added he, "you have omitted in your petitions to ask for one power of the mind, without which all acquirements lose their value, and even the best feelings of the heart will be rendered useless. Now is the time to repair your error—ask quickly for that essential blessing for your boy, and you shall have it."

'My mother's heart beat high; her thoughts became so much confused, that it was some time before she could command them sufficiently to decide upon what this nameless treasure could be. She fancied she heard the quivering of the angel's wings, as he rose into the air to depart;

and, in an agony of despair lest she should lose for ever this precious gift, she struggled to utter the wish which now was uppermost, but, in her effort to speak, she awoke.

‘ Now tell me, my friends, what was the wish that trembled on her lips, and you will have my word.’

I guessed it, and told some dull story which is not worth repeating ; the rest of the company told theirs ; but as I have not time for all, I will go on at once to Caroline, who, with a pretty little blush, thus began :—

‘ Three young children were coming down the Mississippi with their father in a sort of a boat which they call there a pirogue. They landed on a desert island in that wide river, in a bitter snowy evening in the month of December ; their father left them on the island, promising to return after he had procured some brandy at a house on the opposite bank. He pushed off in his little boat to cross the river, but the wind was high, and the water rough.—The children watched him with tears in their eyes, struggling in his pirogue against the stream, till about half way across, when they saw the boat sink—and never more saw their father. Poor children ! they were left alone exposed to the storm without fire, shelter, or even food except a little corn.

‘ As the night came on, the snow fell faster,

and the eldest, who was a girl of only six years old, but very sensible and steady for her age, made her little sister and her infant brother creep together close to her, and she drew their bare feet under her clothes. She had collected a few withered leaves and branches to cover them, and in this manner they passed the long winter's night. Next morning she tried to support her poor weeping companions by giving them corn to chew, and sometimes she made them run about with her, to keep themselves warm.

‘ In this melancholy state, you may imagine what was her joy, when, in the course of the day, she discovered a vessel—no—a boat, approaching the island. It happily contained some good-natured Indians, who took compassion on the children, shared their food with them, and safely conveyed them to New Madrid in their own boat.’

The mistake that poor Caroline made in saying vessel for boat, and then correcting herself with a little confusion, betrayed her; so that, the moment she ended her story, every one exclaimed ‘ Boat,’ ‘ Boat.’

19th.—In the morning we had a shower of hail, and, since seven o'clock, it has been snowing constantly the whole day. I am delighted with its pure, beautiful, feathery appearance;

besides, it has brought back to my mind little shadows of things that happened before we left England. The ground all white, and the large blazing fire, remind me of the time when we were at Montague Hall, when my grandfather used to employ me to gather the crumbs at breakfast, to put out of the windows for the poor little starving birds. I believe it was that circumstance that gave me such a love of birds; for I am sure I can recollect the happiness I used to feel when feeding them along with good grandpapa, and watching all their little motions.

My uncle was amused with my exclamations of delight at the snow, and he was good enough to show me that each flake has a star-like appearance, consisting of five or six rays that diverge from the centre; and that from each of these rays, little *spicula* shoot out, which, by crossing each other, form a beautiful net-work. He says that when clouds are formed at such a height in the air, as that the temperature there is below 32° , the particles of moisture become congealed, or frozen. If the particles are small, or if they are slowly frozen, they become snow, which gradually descends to the earth; but it often happens that the atmosphere near the earth is so warm as to re-dissolve the snow while falling, so that it comes down in the shape of rain. 'This,' he added, 'cannot take place with hail, because it is so much more solid, and

falls so rapidly, that the warmth of the lower atmosphere has not time to melt it, before it reaches the ground. In summer, therefore, snow may be formed at a great elevation, as people who have ascended in balloons have more than once witnessed, but it again becomes rain in its descent; whereas, hail, for the reason I have given you, has been known to come down in the hottest months of the year.'

I reminded him that he had not told me why the moisture should sometimes freeze into flakes of snow, and sometimes into the pretty little round balls of hail.

'I waited,' he replied, 'till you asked that question; for information is always best remembered when the want of it is felt. If the particles of moisture in the atmosphere are small, and if they are *slowly* congealed, they form themselves into flakes of snow, as I have already mentioned; but when the moist vapour rapidly collects into large drops of rain, and when these are *suddenly* frozen, they become hail.'

'So that, in fact,' said I, 'hailstones are nothing more than little balls of ice.'

'They are ice, but not common transparent ice,' my uncle said, as he opened the window, and picked out a few hailstones from under the snow; 'you see that they have an opaque whiteness, very different from the appearance of ice. The upper regions of the air are not only always

colder, but also less *dense* than those near the surface of the earth ; and the white porous nature of hail is owing to the *rarity* of the atmosphere where they were congealed. Professor Leslie has proved this by the simple experiment of freezing small quantities of water in the reservoir of an air-pump from which the air had been considerably exhausted. Hailstones, however, are not always globular, like these ; I have seen a shower of irregular lumps of ice of a great size, some of them weighing even three or four ounces, and producing dreadful mischief, killing the lambs, and destroying all the crops. Last summer, there was a partial hail-storm, near London, which broke thirty thousand panes of glass in the green-houses of one nursery-ground.'

I am sorry to add, Mamma, that everybody says it is going to thaw ; and there will be an end of all the amusement I have had to-day in looking at the beautiful feathery flakes, as they blew against the windows.

20th.—After dinner this gloomy evening, we had another edition of our story-play. Though very much amused by all I heard, I will only mention two or three little circumstances which may perhaps be interesting to you or Marianne.

The word telescope was whispered to my aunt ; and, in the course of her story, she contrived to introduce the tube through which Prince Ali,

the Arabian Nights' Entertainments, saw his distant friends. She said, she had very little doubt that this must have alluded to some optical instrument, and even that the carpet by which Prince Houssain transported himself through the air was of the nature of a balloon. Both these inventions are generally ascribed to the moderns, but she thinks they must have been formerly known in the East, where, indeed, all knowledge seems to have begun.

Mr. Lumley was so good as to join our circle; and having been given the word elephant, he mentioned a laughable anecdote of a man who took hold of an elephant's tail lately in the streets of London. The animal was so displeased by this indignity, that he turned suddenly round, and, grasping the man with his trunk, placed him against the iron rails, where he kept him prisoner for some time. The keeper at last prevailed on the elephant to let the offender go, but not till after he had received some hard squeezes, for which he complained to a magistrate, who, of course, gave him no redress, as he was the first aggressor.

Mr. L. also told us that a friend of his in India, when riding on an elephant, through a rice-field, observed that the sagacious creature plucked a considerable quantity of the ears, and carried them behind his trunk till the party stopped, when he ate them at leisure.

21st.—The expected thaw arrived—yesterday was odious, half snow, half rain, and everything dirty and dreary. My uncle and Frederick went this afternoon to the poor man's garden, where you know we saw the carrots raised up by the little icy pillars; but this thaw has made the roads so wet, that I could not possibly go with them.

Frederick tells me that all the fairy colonnades which supported the earth about the carrots are now melted, the earth has fallen down, and the tops of the roots are to be seen, quite bare, but above the ground, and appearing as if they had been half pulled up by hand.

I asked my uncle if frost pushes up any other kind of root in that way,—and he said that these columns have a quite different effect on fibrous roots, particularly the grasses. In consequence of the strong matting together of their roots, a whole piece of sward between two cracks is sometimes lifted up by these pillars, so as to separate it from the earth underneath. When the columns dissolve, the sward sinks into its former place, and the earth, which has been loosened and minutely divided by the frozen columns, affords a fine bed for the roots to strike into, so that it is rather an advantage than an injury to them to have been thus loosened. After the frost is melted, he says, he has seen patches of the sward lifted up with nearly as

much ease as if they had been separated by a parting-spade.

Frederick asked what effect frost had upon soils which are not spongy.

My uncle told us, that in clay soils the water forms small detached crystals, so thickly interspersed through the whole mass, that when a clod is broken, the fractured part looks as if covered by hoar frost; but they are too small for the naked eye to distinguish their shape. They help, however, to divide and loosen the clay in those stiff lumps; and after a frost the blow of a spade will almost reduce them into powder. Farmers, sometimes, in expectation of this effect of frost, sow their wheat in very rough ground in autumn, in order that the clods, being pulverized by it, may close round the roots of the young plants; and these benefit by it as drilled corn does by *landing*—that is, having the earth laid up by the plough against the little seedlings when they have grown to some height. In mild winters, farmers are disappointed in this; but my uncle says it is but a lazy mode of farming, and deserves to be disappointed.

Do you know, Mamma, that I think it is colder and more uncomfortable than during the frost. The birds, however, seem to be rejoiced: I hear them chirping their satisfaction—and all the robins that we had in the house (we had seven at one time) have left their good shelter,

and flown off to their companions, by whom I hear they are not likely to be welcomed ; I suppose they are despised for not bearing the hardships of the season as well as the others.

22nd, Sunday.—My uncle read the Ten Commandments to us to-day, and afterwards addressed us on the subject ; and though I know that I cannot do justice to all he said, I will try and note down a little of it.

‘ “ And God spake all these words.” The Hebrews emphatically called these commandments the “ Ten Words ;” and the same term having been adopted in Greek, they have obtained the name of *Decalogue* in every modern language. Though all mankind were bound to obey the precepts contained in these important laws, yet as they were more especially addressed to the Israelites, the tables on which they were engraven were preserved in the ark with great solemnity, and were distinguished from the rest of God’s ordinances by a peculiar veneration, as containing the covenant of the Lord. The Mosaic dispensation is at an end, but these commandments continue in full force ; for we find that our Saviour and his apostles quoted them as matter of perpetual obligation to Christians ; who are now, as the Jews were formerly, “ the Israel of God.”

‘ In order to understand their full extent, it

is necessary, my dear children, that you should *study* them attentively ; for, though they are contained in a few brief precepts, they really comprehend a complete code of morality. You must consider that there is much more implied than is expressly ordained ; and that each commandment is to be understood as a concise text, reminding mankind of the whole sum of their duty on that particular head. For instance, when any one sin is forbidden, it is evident that every offence of the same nature, though of a lower degree, is also forbidden ; and that, as we well know how easily we are seduced step by step, so we are bound to abstain from every indulgence which may act as a temptation to violate the principle of that law. We are not to be contented with a cold and literal obedience to this divine codé. Whatever virtues are enjoined to us, it is equally our duty to induce others to practise them ; whatever is prohibited, becomes a double crime in us if we tempt others to commit it ; and observe, that for this enlarged sense in which we are to view these commandments, we have the direct authority of our Saviour.

‘ The introduction to the commandments states the grounds on which God required the obedience and adoration of the Jews ;—1st, that he was the Lord their God ; and 2dly, that he had triumphantly delivered them from Egyptian bondage. And let it be ever impressed on your

minds, that these reasons apply to us Christians, no less than they did to the Jews; for He is the Lord *our* God by a more excellent covenant than he was theirs. He has relieved us from that slavery, of which the Egyptian bondage was but a type; and, instead of the land of Canaan, he has prepared for us an inheritance in heaven.

‘The first and second commandments, in which we are forbidden, under a dreadful penalty, to swerve from the worship of the one true God, or to kneel to any created being, seem to have been framed in allusion to the gross idolatry of Egypt, where all manner of living creatures were adored; and this allusion must have strongly reminded the Israelites of the want of power in those mock deities, who could neither prevent the plagues which they had just witnessed, nor could they enable Pharaoh, though backed by a mighty army, to detain them in that country.’

My uncle then went through all the other commandments, and said a great deal to us about the divine institution of the Sabbath; but when he came to the tenth, ‘This,’ said he, ‘stamps the seal of divinity upon the whole Mosaic code, of which the Decalogue is the summary. No such restrictions are to be found in the laws of the most famous heathen legislators; neither Lycurgus, nor Solon, nor Jus-

tinian, interfere with the desires of the heart ; they knew that human thoughts are not cognizable by human tribunals ; but it was a command which naturally came from Him who both can and will “ bring every work into judgment, with every secret thing, whether it be good or whether it be evil.” How finely,’ continued my uncle, ‘ has our Saviour commented on this commandment in his Sermon on the Mount ! It is not the mere outward observance of the law that he inculcates, but the inward principle of obedience ; it is the word of the law written in our hearts.’

23rd.—The circumstance that Caroline told us lately of the children on the desert island, in the Mississippi, naturally led to some conversation about that prodigious river, and the countries through which it flows.

We looked at its course to-day, in my uncle’s large maps of North America. He showed us an account of it in Morse’s Geography, and he made us observe, that, taking in all its windings, it is upwards of a thousand leagues in length ; that it passes over twenty degrees of latitude ; and, after joining with the Missouri, and receiving a multitude of smaller streams, though many of them are navigable for hundreds of miles, it pours its united waters into the Gulf of Mexico.

It is evident, he says, that the country through

which it runs, was formerly inhabited by a more intelligent race than the natives now appear to be ; for large mounds of earth are frequently met with near the banks of the river, within which are found the remains of pottery and other articles, of a superior kind to those now in use amongst the Indians, who are in a very low state of civilization, and but thinly spread over that immense valley.

The Mississippi rises, as he showed us, in a region of lakes and swamps, which are scattered over a table land extending from that great ridge called the Rocky Mountains, nearly to Lake Superior, between the 48th and 49th parallel of latitude. In the first division of its course, it passes slowly and smoothly through *savannahs*, or low plains, covered with wild rice, rushes, and other aquatic plants, the rank growth of which is so great, that travellers say, that as they sat in their canoes, the adjoining forests were completely hid from their view by the lofty fields of waving grass.

In the second division begins the granite country, with forests of elm, oak, and other lofty trees. Then come the dry *prairies*, which are the great resort of the buffalo and deer ; and in which sycamore and black walnut begin to appear.

In the third division, which extends above

800 miles, the river increases vastly in breadth; flows through limestone rocks, and receives several tributary rivers, by some of which, boats may communicate, with short interruptions, between the gulfs of St. Lawrence and Mexico.

Lastly, begins the extensive tract of land, known by the name of the *Great Swamp*, or, as it is sometimes called, the Dismal Swamp.—Scarcely a tree or bush is to be seen for 300 miles, except the deciduous cypress, which gives a peculiar and gloomy aspect to this unhealthy region; and, to add to its horrors, it is subject to frequent earthquakes. Lower down, the banks of the river consist of clay, sand, and gravel; almost every flood undermines some parts of them, which fall in, and carry away whole fields and plantations into the stream.—From a place called Baton Rouge, which is about 140 miles above New Orleans, to the sea, they are scarcely elevated above the level of the river, and would be overflowed during the floods, but for artificial embankments, called *levées*, by which the long narrow line of plantations is defended. All beyond these embankments is one vast level, swampy surface, covered with reeds and rushes, and totally destitute of trees. The inundations are said to have sometimes risen to the height of fifty or sixty feet.

The breaking down of a *levée*, with the tre-

mendous rush of such a body of water, brings certain destruction on the neighbouring plantations. At those times, the whole surface beyond the sloping banks appears, for thousands of square miles, as one vast ocean; and only four or five years since, upwards of three hundred plantations were overwhelmed with water, and their crops totally destroyed. Very strict regulations have, therefore, been established for the prevention of this misfortune.

In these dreary plains a pretty little species of marmot is found; it is called the 'Prairie-dog,' from a supposed resemblance of its cry to the hurried barking of a dog. The habits of this animal are so social, that they live together in burrows which are called '*Prairie-dog villages*,' and which sometimes spread to the extent of many miles: the entrance of each burrow is through a small mound of earth, of a foot or eighteen inches high, on the summit of which the little animals sit and bark, and flourish their tails; but they plunge in on the least appearance of danger. In winter they become torpid, having first securely closed up the entrance of their burrows, and made a nest of fine dry grass, with a small opening just large enough to admit a finger, and so compact, that it might be rolled along the floor without injury. The burrowing owl is said to inhabit these plains also, dwelling

in burrows of the same description as those of the prairie-dog.

24th.—This day, our good friend, Mrs. P. left us—I am very sorry to lose her; and so, indeed, is every person in the house.

She had promised, you know, to tell me her history, but circumstances induced her to put it on paper, and I shall lose no time in transcribing it for your amusement, my dear Mamma.

She was anxious to return to her father and mother, as her boys spent this vacation with Mr. Crispin, a very old friend.

To-morrow, as soon as the Lumleys go away, I shall begin to copy her history.

26th.—My indulgent uncle had requested the gardener, or any one who happened to find a dormouse, to bring it to him; and Franklin, in stubbing up an old hollow root of a tree, luckily found one of those little fat creatures fast asleep. It is more plump, but very like a common mouse; the nose is blunter, and its tail is not so pointed: it is of a dun red all over, except the throat, which is white. It lay in a most comfortable little nest of woven grass, which has not been disturbed; and beside it there was a small collection of nuts and acorns.

My aunt has lent me a cage, and we shall see

whether the warmth of the house can overcome its habit of sleeping during the rest of the winter ; but I shall not for some days put it into a warm room ; it shall be treated as if it had been frozen, and revived very gradually.

The same person, my uncle says, who tried the experiment on crickets, which I mentioned to you a fortnight ago, shut up some garden snails in a wafer-box, where he secluded them from food and water ; but not from air, for he made several small holes in the box. He also put a few snails into a bottle from which all air was excluded ; they, of course, died : but those in the perforated boxes retired into their shells, the aperture of which they closed with a thin membrane ; and there they remained apparently dead, as long as they were kept dry. On being dropped into water, of the temperature of 70° , they were found quite alive in four hours, and sticking to the plate which covered the vessel. One large snail was imprisoned for three years, and yet it revived on being put into water.

I was told a most singular instance of the length of time for which life may be suspended in those animals. Some snail-shells had for many years formed part of a little museum ; one night the window of the room was left open ; heavy rain beat into the case, which had not been shut ; and the next day, what had been

considered only specimens of shells, were found crawling about the walls.

This faculty, however, is not peculiar to snails; for M. Socoloff, a Russian, found that some flies and small beetles, which had been long immersed in spirit of wine, had returned to life on being thrown into warm wood ashes. He was astonished at seeing the flies start up, and, after wiping the dust from their wings, fly away as if nothing had happened.

29th, Sunday.—My uncle told us this morning, that the book of Leviticus was so called, because it describes the sacrifices and services of the tabernacle, which were to be performed by the tribe of Levi. He then read to us some of the chapters, and he answered in the kindest manner the questions which we all put to him, about the different offerings, and the regulations to be observed by the priests.

As he closed the book, he said, ‘The object of these observances has passed away with the Mosaic dispensation, and it is now only necessary to understand their general tendency. Sacrifices and offerings had been established in the infancy of mankind, and, though perverted by folly and idolatry, they continued to form a part of every worship in every country. It was the universal belief that sins could only be expiated

by corresponding sacrifices of what was most valued; and gratitude for worldly blessings and riches seemed to demand some proportionate offerings.

‘Sacrifices, offerings, and ceremonies were a kind of *representative*, or figurative worship. Compared with the present state of the world, the people of those days had few abstract ideas; even their arts, and sciences, and particularly their religious systems, were in a great degree described by allegories, types, and hieroglyphics; and though we can with difficulty see the connexion now, it is probable that every outward rite that was then enjoined to the Israelites, was really typical of some inward principle of virtue, or of some distinct point of faith. Taken altogether, it is certain that their object was to discipline that stubborn people into obedience—to preserve them from the surrounding idolatries—to keep them separate from all other nations, as depositories of the revealed truth—to train them for the reception of a new dispensation—and, above all, they were designed to prefigure the great and final atoning sacrifice of the Messiah.’

30th.—The weather has been so soft and mild for the last week, that it seems as if we had only dreamt of frost and snow. After the thaw, the ground, and even the walks, were so wet, that we

could not go out of doors with any comfort, and as I had a little cold, I stayed in the house for a few days ; so I was the more surprised at seeing what a change has taken place. The wheat-fields look greener than ever ; the buds of the lilac and sycamore are swelling, and the woodbine leaves are actually bursting open. The flower-buds on the mezereon, which Mary showed me last September, are now opening ; and a few scattered flowers, which are quite blown out, show us their pretty pink faces, and promise a delightful smell. But more than all, the snowdrops have already appeared, and in the sheltered spots there are many bunches of them quite opened. It is the most innocent, modest looking little flower ; and with its pure and delicate white, forms a charming contrast to the dirty appearance of the walks.

The snow-drop blooms
Ere winter's storms are past,
As she shrinks below
Her mantle of snow,
And trembling shuns the blast.

Feb. 1st.—Dreary as this season is, I find it better than I had expected ; but, indeed, there is so much pursuit and rational occupation in this house, that it is impossible to feel any day gloomy.

We have now a return of frost, and besides those birds which venture into the house, there are several others which crowd round it in flocks

to seek for food. Sparrows, chaffinches, and yellow-hammers are to be seen every day at the barn-doors, pecking what they can find ; and Mary has shown me the larks, sheltering themselves in the stubble ; and the thrushes, black-birds, and even fieldfares, nestling together under the hedges, as if endeavouring to console each other.

While the ground was covered with snow, I saw the blackheaded titmouse come every day to a thatched shed in the yard, and with its back downwards, draw out the straws lengthways from the eaves of the shed, in order to seize the flies concealed between them ; and I assure you, such numbers came to one spot, that they quite spoiled the appearance of the thatch. Mary says they are very useful in searching for the *larvæ* of the *tortrix*, those ingenious caterpillars, that disfigure the leaves of fruit-trees, by rolling them up for their houses. Gardeners, she says, are very ungrateful to these birds ; for supposing that they attack the blossoms, they are destroyed without mercy. They are, however, eaters of bees, so that they must be considered somewhat mischievous.

They are easily tamed and taught little tricks, such as drawing up a bucket. Mary placed some almonds yesterday on a sheltered bank ; in a short time one of these little black-heads came, and grasping the largest of them in his

claw, broke the shell by repeatedly striking it with his sharp bill, and then dexterously drew out the kernel.

My uncle walked with us to-day to Farmer Moreland's, that we might see what out-of-door work was going on in this frosty weather. Besides drawing manure into the fields, while the ground is hard, we found his men busy in mending the hedges and fences; and now that the roads are pretty smooth, he will employ his team in carrying hay and corn to market. Afterwards, if the frost should continue, he says, he will draw coals, which will be no great trouble—there are so many coalpits in the forest. We heard the cheerful sound of the *flails* as we passed his barn;—he was threshing out all his barley to sell for making malt. As we walked home my uncle told me the process of malting.

'Beer is, you know,' said he, 'a fermented liquor, made generally from barley after it has been converted into malt; as in its natural state it would produce but an imperfect fermentation.

'The grain is first steeped for two or three days in water, that it may soak and swell to a certain degree. The water being then drained off, it is laid on the floor in a heap of about two feet high, when, with the warmth of the house and the imbibed moisture, it begins to *germinate*, and to shoot out its radicle; which is checked

by spreading it out thinner, and frequently turning it over with wooden shovels to cool it. These operations require several days, and it is then thrown into the malt-kiln and slightly baked. The time it is kept there, and the heat to which the kiln is raised, depend on the kind of beer to be brewed, and the required colour for the malt; it is, however, enough for you to know, that from eight to twelve hours is sufficient; and that from 130° to 160° of the thermometer gives all the varieties of colour from pale ale to the brownest porter. By this process the grain undergoes a material change; it acquires a saccharine or sweet quality which it did not possess before, and which is destroyed if either the germination or the kiln-drying are carried too far. It also loses a great proportion of the mucilage that it contained; which is the reason why the flour of wheat that has been reaped in wet weather is generally bad; the grain partially heats in the stacks, a tendency to germinate takes place, and there is, therefore, a deficiency of that nutritious part, the mucilage. In this case the flour is said to be *malty*.

‘ This accounts for the bad paste which your aunt had some days ago; it was made of malty flour, and you know it had not the adhesive quality of good paste.’

3rd.—How pleasant it is to find some

chance circumstance relative to any subject, about which we have been interested. Here is something that I found in Scoresby's Journal; and it seems quite to agree with my uncle's opinion.

'This night stars were seen for the first time during fifteen weeks, the sky being beautifully clear. The sea, as usual on such occasions, began to freeze as soon as the sun descended within four or five degrees of the horizon, though the temperature of the air was considerably above the freezing point. Whether the heat of the water be radiated into the atmosphere, according to the theory of Dr. Wells, or whether a cold influence of the atmosphere be conveyed to the water, may be a doubtful question; but the fact, that the water more rapidly loses its heat when exposed to the full aspect of a cloudless sky, is certain. In cloudy weather no freezing of the sea ever occurs, I believe, till the temperature of the air is below 29° ; but in the instance now alluded to, the freezing commenced when the temperature was 36° , being about 8° above the freezing point of sea water.'

5th, Sunday.—My uncle said to-day that before we quitted the subject of the Jewish sacrifices, he had a few more observations to make, to which he requested our attention.

'In a worldly point of view,' he said, 'the

punctual performance of all those rites, and a strict obedience to the ceremonial law, were the terms on which the Israelites were to inherit the land of Canaan; and in a spiritual sense they were to be considered as the means of sharing the benefit of that great sacrifice of Christ, which was to lead to the inheritance of the heavenly Canaan. The institution of animal sacrifice had continued until the giving of the law, no offering but that of an animal being mentioned in Scripture up to this period, except that of Cain, which was rejected. But when the law was ordained, we find that the connexion between animal sacrifice and atonement was clearly and distinctly announced; and that certain prescribed offerings were to be accepted as the means of deliverance from the penal consequences of sin.

‘He who presented a sin-offering was commanded to lay his hands upon the head of the animal, as a confession of his own guilt, and as an acknowledgment that the punishment he deserved was, by the gracious forbearance of God, transferred to the victim. On these terms the offering was accepted, and a conditional pardon granted. The Hebrew word for sin-offering includes the sense of cleansing, expiating, and making satisfaction; and therefore every sin-offering, 1st, implied contrition and repentance; 2dly, an humble hope of averting a just chas-

tisement by this figurative retribution ;— and 3rdly, a firm belief in the efficacy of the great final atonement. The Jews well knew,' added my uncle, ' that none of these sacrifices had in themselves sufficient value to clear the criminal, or to procure his pardon ; they knew that they were only instituted as a public avowal of his crime, and as a type of the perfect expiation to be afterwards made by Christ for the sins of mankind.

' It was indeed the object of all the sacrifices of the Mosaic ritual, to impress the people with the necessity of expiation, even for involuntary offences ; and to fix in their minds that awful maxim, as St. Paul expresses it, that "without shedding of blood there is no remission." This lesson was inculcated in the earliest sacrifice upon record—when respect was had to Abel's sacrifice of the firstlings of his flock, rather than to the husbandman's offering of the fruit of his ground ; and afterwards in the covenant with Noah, as well as in various parts of the Mosaic law, where blood was in the most absolute way prohibited to be eaten, as being a holy thing consecrated to the purpose of general expiation. This expiatory, however, the apostles emphatically say, belonged not to the blood of bulls and of goats, but to the blood of Christ, of which the other was only a temporary emblem.'

My uncle then read to us the several parts of

Scripture to which he had alluded ; and he added, that though we are now ignorant of the particular object of the ceremonies and minute directions for the sacrifices and offerings, we may perceive that solemnity and reverence were strongly enforced in all, with an exactness of obedience to lesser regulations, which shews that neither must we neglect the smaller duties while we obey the ‘ weightier matters of the law.’

6th.—A number of curious circumstances were mentioned at breakfast, in a conversation on the force of habit, not only in animals, but in vegetables ; and my uncle thinks it is a subject on which further inquiry would not be more interesting to the philosopher than useful to the farmer and gardener. I have only time to write a very little of what he said.

He told us that there are several plants, which have been naturalised in cold climates by bringing them there step by step. Rice he gave as one instance : it is a native of the East Indies, within the torrid zone, but was early cultivated in South Carolina, the Canaries, and the northern parts of Africa ; and about a hundred years ago it was sown in Italy. It has ever since been creeping towards the north of Europe, and there are now very large plantations of rice on the banks of the Weser. It is, however, necessary in Germany to use the seed which has been ripened

there ; that of Carolina will not thrive at all, and Italian seed but indifferently, being destitute of that power of withstanding cold, which the German rice has acquired by habit.

Another example of the gradual effect of habit on plants my uncle learned from the late Dr. Walker. The Brazilian passion-tree is, you know, an evergreen in its native country ; but when the doctor was a boy, in 1773, some plants of it near Edinburgh annually lost their leaves. During his life, however, they became gradually inured to the climate ; and he says that in his latter years, in sheltered situations, they have retained their foliage through the whole winter.

I asked my uncle whether those plants, which have come from a warmer region, and are naturalised here, flower later in this climate than in their own.

‘ The times of the appearance of vegetables in the spring, seem,’ said he, ‘ to be influenced by early acquired habits, as well as by sensibility to heat. That same Dr. Walker, whom I mentioned a few minutes ago, had some very singular ideas on this subject : his opinion was, that plants removed from one climate to another, generally observe their original season of flowering, unless prevented by some powerful cause. The climate of Spain and Portugal, in December and January, suits the flowering of the *laurestinus* ; and you have seen that the cold of Glou-

cestershire, in those months, was not sufficient to deter it from following its old habits. In the northern parts of Scotland, however, it does not flower till April. Dr. Walker thought the flowering of any shrub in winter, in this climate, was an indubitable proof of its not being a native ; and he therefore supposes the arbutus to have been a native of Iceland : in the fact, I believe, he is right ; but when the similarity of the climates is considered, it is rather a whimsical proof of his doctrine.

‘ He gives, however, several instances of plants brought from the southern hemisphere, which flower there at the time that the sun is in the tropic of Capricorn, and which adhere in this country to their old December rule, without obeying the influence of the sun when in Cancer.’

I afterwards met my uncle in the garden, where he showed me an immense quantity of buds on the peach-trees, and took great pains in teaching me the difference between the flower-buds and leaf-buds—the former, short, thick, broad, and full, with a downy covering ;—the leaf-buds, much less downy, longer, and not so thick. In a few weeks, he says, I am to see these trees in full flower, notwithstanding this wintry weather.

7th.—From all I had heard Colonel Travers say about rice, I imagined that its cultivation

was almost confined to India; and I had no idea, till yesterday, that it grew in North America, and even in Germany. I renewed, therefore, the conversation to-day; and I now find that it is so much cultivated in Spain, particularly in the low parts of the province of Valencia, that a very large quantity is exported every year.

The ground is prepared for it there by first sowing beans; and when they come into blossom, which is about March, they are ploughed in for manure, and flooded with water to the depth of four inches. After a third ploughing, the rice is sown; and when it comes up, it is transplanted to another prepared field, and again covered with water. Each stem produces about twenty-four fold. When ripe it is gathered in sheaves, and put into a mill, the lower grinding-stone of which is covered with cork, by which means the chaff is separated without bruising the grain.

My aunt tells me that rice grows wild in the swamps of Upper Canada; and that the shallow parts of Rice Lake, which is near the residence of Mrs. * * *, is full of it. Her letters describe it as having the appearance of reeds with long narrow leaves, and bearing clusters of flowers at the top of the stem.

It is curious that the plant chiefly cultivated in the Sandwich Islands for food is managed very like rice;—the *taro*, to grow in perfection,

requiring irrigation. The fields are divided for that purpose, like the rice grounds of the East, into small squares which may be easily flooded, and the roots are planted in rows. The root of the taro when roasted resembles the yam ; but it is usually pounded into a paste, and then mixed with water, so as to become of the consistence of porridge.

The Sandwich Islands are nearer to you than to England, and yet perhaps you do not know, dear Mamma, that although the bread-fruit is the most important of all their vegetables, they have another very useful one, called *Tee* by the natives. The root is sweet, and produces a pleasant liquor, but a little intoxicating. The leaves woven together form a light cloak for the inhabitants of the mountains ;—something like those formed of the palm-leaves by the poorer natives of Hindostan, to shelter them while at work in the open fields. Fences are often formed by planting the tee roots close together ; but what makes the plant particularly remarkable is, that a stalk of it is with them the symbol of peace, as a branch of olive is with us.

!

Of the bark of the paper mulberry that ingenious people manufacture very nice cloth ; they make beautiful mats from the leaves of their palm trees ; and you know what pretty cloaks and caps of feathers have been brought

home from all those islands. They even stamp their cloth with patterns; and their weapons and bowls are highly carved. 'This shews,' my aunt says, 'that whenever people arrive at a certain point of civilization, that is, as soon as their food and other necessaries of life are surely and regularly supplied, the ornamental arts as surely follow.'

She afterwards added, that she thought it would be a very nice winter amusement for us to describe to each other the arts and luxuries as well as the principal natural productions of the different parts of the globe.

My uncle approved of this idea, and we are to try it sometimes as we sit after dinner round the fire. I fear I am quite too ignorant to attempt to bear a part; but I am sure I shall be delighted to listen.

8th.—The sun rose this morning so brilliantly, and the distant hills looked so remarkably blue and clear, that I was sure we should have a fine day and a long walk; but my uncle told me that, at this season, both of those appearances indicate rain; and he took me to the barometer, and showed me, by his meteorological journal, that the mercury had been *gradually* falling ever since Monday night, and that it was very hollow on its upper surface. From all this he thinks there will be some days of continued bad wea-

ther. Accordingly, before breakfast was well over, the clouds began to collect about the mountain tops, and it is now raining. I have already made some progress in transcribing Mrs. P.'s memoir for my dear Mamma; and if my uncle's prediction be correct, I shall have time to finish it before the return of dry weather.

MRS. P.'s NARRATIVE.

I am now going to fulfil my promise, Bertha, by giving you a sketch of my life; and as I shall begin by a detail of those early circumstances which have unceasingly influenced its happiness or misery, there will seldom be occasion to interrupt my narrative in order to point out their consequences. You will have no difficulty in perceiving how inevitably my errors led to their punishment; how certainly the heart is corrupted by selfish indulgence; and how pursuits, that in themselves are laudable, may become pernicious, if not controlled by a sense of duty.

I was unfortunately what is called a very promising child, quick in all my perceptions, and equally capable of retaining the knowledge I so readily acquired. My parents, delighted at my progress, were proud of their child; and by friends and visitors I was considered a prodigy. This injudicious praise had so powerful an effect,

that, when I was about twelve years old, I determined to lay aside the common amusements of children, and to become a singular and distinguished character. My ambition was the more easily fostered, as in our retired situation we had but few neighbours ; and, therefore, an occasional interview with their children, or a chance visit from my cousins, supplied me but scantily with opportunities of giving way to the natural activity of youth, or of having my pedantry successfully ridiculed by companions of my own age.

The pleasure which I had formerly taken in learning whatever was difficult, in order to astonish my mother, now became a real wish for knowledge ; and as my ardour increased every year, I studied many subjects which are not in the usual course of female education. Though my mother would by no means have approved of such pursuits for other young ladies, yet so great was my influence, that I was not only uncontrolled by her, but even assisted by my father, as far as his own powers permitted.

The attainments of either were very limited : they had amiable but narrow views of life ; they were devoted to each other, and to their children ; and to the poor around them they were actively useful and benevolent. But their income was moderate, and my mother was obliged to practise the most indefatigable economy in order to ensure to her family those comforts

which she thought they were entitled to enjoy, as well as to enable her to assist those whom she considered as dependent on her bounty ; and, at the same time, to save something every year as a provision for their children. About all this I then knew or cared but little ; I was insensible to the merit of her steady perseverance in these duties, and thought very lightly of the talents necessary for such management ; or I thought of them only to regret that intellectual creatures could waste so much of their existence upon such vulgar labours.

I have, in latter years, often wondered how my mother's plain good sense could be so blinded by partiality, that she never even tried to conquer my absurd fancies, and, by forcing me into obedience, to teach me to be useful ; indeed, it is most painful to me now to think of her generous but ill-judged forbearance.

While she was engaged in superintending her servants, or instructing my young brothers, or occupied in needle-work for us all, during whole days, with scarcely the interruption of a walk, or the indulgence of a book, I was poring over my high-flown studies ; perhaps reading Horace with one brother, or conquering mathematical difficulties with the other ; or, seated under an old ilex-tree in the lawn, writing verses. Sometimes, to gratify my mother, I condescended to practise on the piano-forte ; but this was one of

the secondary employments which I despised ; a thing for show ; a silly waste of time ; nothing that could benefit mankind by the developement of the human understanding.

When I was eighteen, my philosophical enthusiasm became so great, that every moment seemed lost which was not devoted to scientific pursuits. To waste that time and those powers which were given me for the noblest purposes, in the common nothings of life ; to sit with my friends, listening to the trifling gossip of the country, or to homespun discussions, were sacrifices to which I would seldom submit, and I always broke away from them with undissembled scorn.

Many a lonely hour that she has passed repairing the clothes of which I disdained to take care, I might have cheered her by my company ; or enlivened my father's evenings by a little simple music, in which he delighted. But conceit and selfishness always accompany each other ; and, what is more to the point, always lay the foundation of their own punishment ; the very talents and pursuits which, under proper control, ornament and raise the female character, became, by their abuse, my incessant bane. I had the pride of human intellect ; and prayed for knowledge : alas ! I never prayed for wisdom, nor for humility.

I will give you an instance of my odious

selfishness, because it shews how short the space is between right and wrong. I went one evening to the drawing-room in search of my brother, but he was not there. My father had a book open near him, though he was not reading; my mother was working, and both looking sad and anxious; I was quickly retiring out of the room, when my father, stretching out his hand, and drawing me gently towards him, said, 'Gertrude, my love, stay with us. We have had some unpleasant news to-day. Your poor mother and I are too low-spirited to amuse each other; and we want you, my dear child, to cheer us a little.'

'Yes, papa,' said I, 'I will come as soon as I can,' and I hurried away.—I shall never forget his look of disappointment.—Can you believe it?—I was so callous to every good feeling, that I coolly sat down to finish some mathematical question in which I had been engaged, before I condescended to return!—But you will ask—had I no principles, no sense of duty or religion to guide me?—Yes, I had principles, but they were always warped by some silly enthusiasm: I had religion, but it was that sort of highly-wrought sentiment which produces no good fruits; it was very spiritual, I thought, but it had little influence on my actions.

My mother was anxious to bring me more into the world; and I complained myself some-

times of the want of amusement ; but I professed to despise company of all kinds : dancing was an absurd waste of life, and the stiff country dinners were tiresome. Had my vanity, indeed, been more gratified at the balls and parties to which I was taken, I should, probably, have liked them amazingly ; but the truth was, the ladies thought me learned, and were afraid of me, and neither my appearance nor my conversation pleased the other sex ; I therefore discovered that such occupations offered but little enjoyment to a cultivated mind.

When I arrived at the age of twenty-four, I was a strange compound of selfishness and sentiment, of folly and learning. Of every species of useful knowledge I was ignorant ;—to make or mend my clothes I considered degrading ; and all the details of domestic economy I treated with contempt. My mother reasoned with me, but in vain ; my father interfered, but it was too late : my habits were formed. My parents could not always conceal their feelings of disappointment, and I withdrew more than ever to my own ideal world of poetry and science, and to studies which, I cannot too often repeat, are praiseworthy only when kept in due subordination. My father, once said to me, with tears in his eyes, ' The time will come, Gertrude, when you will feel your mistake ; '—and it did indeed come.

Mr. P., a college friend of my brother's, came

to visit him about this time, and spent a week at our house. He was as enthusiastic as myself, ardent in science, and perfect in classical literature ; he was, in a word, the most amiable and accomplished person I had ever known. Pleased with my conversation, he paid us repeated visits ; and, without sufficiently studying my character, he sought to win my hand. It was the most foolish thing that Mr. P. ever did !

The attentions of such a man were irresistible ; he really gained my heart, and I soon consented ; anticipating with delight, as I told my mother, a life devoted to him and to science. My father, however, entirely disapproved of the match, as Mr. P. had a very small fortune, and as it was too obvious that I was unfit to be a poor man's wife. I exerted all my former influence to coax him into acquiescence ; but the most I could obtain was, that instead of an absolute refusal, he insisted on our waiting for a year, that we might each have time to understand the duties and difficulties of a married life.

I had been accustomed, not merely to indulgence, but almost to deference. Gertrude's opinion had always been consulted ; her advice had always prevailed ; and was she now, and in a matter of such importance, to be controlled like a child ? ' No, sir,' said I, ' Mr. P. is *my*

choice, and I will not risk my happiness by submitting to any delay.'

My father persisted, though there was a painful struggle in his affectionate mind; and my mother tried the effect of persuasion with me, but my passionate temper would brook no restraint. At length, one of my brothers became alarmed, and thought it right to intercede; he mildly opened their eyes to the conviction, that my determined character was their own work, and that it was now too late to retrace their steps. He pointed out to them the dislike I had excited in the neighbourhood by my contemptuous and satirical conduct to everybody; and the ill effect that the reaction of that feeling might have in still further hardening my disposition; and he endeavoured to convince them that a husband's influence was the only chance left of withdrawing me from the follies they lamented. He then urged the family, the education, and the manners of Mr. P., who had everything but wealth to recommend him; and earnestly implored my father to relent.

He succeeded. Mr. P. was accepted, and settlements were now to be discussed; but scorning all inquiry into the income of one whom I loved only for his merit, I indignantly exclaimed:—

Can gold calm passion, or make reason shine?
Can we dig peace or wisdom from the mine?

· We were married, and went home to a sweet little place which Mr. P. had on the banks of Ulleswater. The estate was small, but had been in his family for ages ; the house was a two-story building of olden times with projecting windows ; it was situated in a valley which was sheltered from every cold blast ; and altogether looked as if it must be a happy home.

‘ You are mistress of this humble place, Gertrude,’ said Mr. P. ; ‘ and over my purse you have unbounded power. Your wishes are moderate, and you well know that our expenses must be limited by discretion. This property has been sufficient for my father and my ancestors ; I hope you will assist me in preserving it free from debt and incumbrance for my successors. Of few things I have a greater horror than the disgrace of debt. Remember then, dearest Gertrude, that in our present situation economy becomes an essential duty.’

I considered this speech as so very devoid of sentiment, that I did not deign to reply.

In a few weeks, my mother came to visit us ; in her own kind manner, she assisted me in my domestic arrangements, with as much anxiety, I thought, as if matter of life or death ; and having established me with good servants, and put into my head more ideas than I had ever admitted before on the subject, she left me in a very happy state.

The summer did pass happily. Mr. P. had such a variety of tastes, and so kindly adapted them to mine; we enjoyed so much our studies at home; our mineralogical and botanical rambles; and our sketching and boating parties, that our life glided away in real felicity. As autumn and winter advanced, we spent less time out of doors, and more was given to our visitors, who remarked that now there might be some chance of seeing us comfortably. But the house was never comfortable to visitors. My dinners were ill-arranged, and every thing was irregular. An old gentleman, who had been intimate with Mr. P.'s father, and who continued the warm friend and counsellor of the son, used frequently to ride over on a frosty day to dine and sleep; or sometimes called upon us for luncheon after he had been shooting. But he always came at some unfortunate time; when our dinner was shabby, or ordered at some late hour: or perhaps there was no fire to warm him after a cold ride; the unswept hearth strewed with cinders; the room all littered, no one to receive him, and when I did appear, probably my dress untidy, and a frown on my brow. He had long had the habit of speaking his mind, and very mortifying things he sometimes said, which made me hate him.

‘Why, madam,’ (a beginning which, from him, always shewed displeasure,) ‘you seem to

have a fresh cargo of new books every time I come here. Let me see—Chemistry, Botany, Geology, Italian Tales, and Scotch Novels. All admirable food for the mind, to be sure ; but we old fashioned folk are vulgar enough to like a little comfortable food for the body, also. Economy turned upside down !'

I had determined to make our little place a paradise. The garden, which was to be brilliant at all seasons, was, therefore, crammed with flowers, and the most beautiful shrubs were to ornament my new walks ; a simple pleasure, thought I, to which no one can object. Every week matted parcels of treasures arrived by the coach, from distant nurseries ; and as Mr. P. acquiesced in all my suggestions, we planted and worked together. In thus beautifying our place, we never imagined that we could incur any great expense ; besides, when the thing to be done was good, I thought it a proof of a narrow mind to consider the cost. For the same reason, I paid no attention to the weekly accounts of my house-keeper. She understands managing much better than I do, and all those little particulars, of a few pence perhaps, are really beneath my notice.

At last we were blessed by the birth of a boy, and I thought my felicity complete.

Alas ! whene'er we talk of bliss,
How prone we are to judge amiss !

I had sent to London for all my baby clothes,

it seemed such a waste of time to work at them myself. They were beautiful, so was my boy ; and so proud was I of him, that I was profuse in my generosity to all his attendants. I determined to nurse him, and to attend him night and day ; and so completely was I engrossed by this new occupation, that I quite neglected Mr. P., whose inseparable companion I had been till then.

When I was so much away from him, he had more leisure to perceive the irregularity of the house. And when he went out and mixed with others, he could not help feeling the want of comfort at home. Still he could not bear to think that I was in the wrong.

In two years came another fine little boy, and with him fresh expenses. I just then began to feel that money was not always to be had ; long accounts for dress, and fanciful furniture, for new books and scientific journals, for plants, shells, and mineralogical specimens, and a variety of other things equally necessary, came crowding in ; and when I asked for money there was none at command. My husband thought that I had paid for all these articles when I received them ; and our ordinary expenses had already absorbed our income. With a blind confidence that almost amounted to weakness, he had trusted to my prudence, and made no inquiries into the household management ; perhaps,

he too had been a little inconsiderate in his farm and plantations; but far be it from me to shade my own errors by throwing blame on him.

I begged of the people whose bills I could not pay, to wait a little; and to keep them quiet I added debt to debt. But, at last, the crisis came, and these doubled and trebled debts, amounting to an enormous sum, appeared in dreadful array before Mr. P.

Then came demands from the country tradespeople who supplied our house; brewer, butcher, baker, &c.; and then, too, we discovered that the housekeeper, taking advantage of my foolish confidence, had never paid them; she had deceived me by false receipts, and had in every possible way betrayed her trust.

This shock awakened me; I understood the extent of my follies, and, too late, saw their consequences: I saw Mr. P. sink under the blow, and oh! Bertha, I did then, indeed, feel remorse. But, although wounded in the most sensitive of his feelings, and involved by me in what he had of all things most dreaded, he said he only reproached himself. His kindness never failed; but I saw that I had lost his respect, and that he could no longer rest his happiness on me. I became fretful and truly miserable, and a sort of reserve and mutual coldness gradually took place of that 'boundless sympathy of soul' which we had till then enjoyed.

To be in debt, Mr. P. considered a state of actual disgrace, and he would have gladly sold his patrimony to emancipate himself from the load ; but it was entailed. There were two other ways, either to raise money on mortgage, or, if his creditors would give him time, to devote the chief part of his income to a fund for the purpose of liquidating their full claims ; and, in the mean time, to live on bread and water, if necessary. He turned over in his mind also a hundred different schemes for employing his time and talents, so as to augment our means ; for I could see that, though he dreaded the privations which I must endure, yet that one of his greatest difficulties was, the doubt whether I could conform to the rigorous parsimony that we were now called on to practise. Anxious for advice, he rode off to consult his old friend and counsellor, Mr. Crispin, whom we had not seen for a long time ; and I was rather surprised by his return the same evening, as he generally slept at the hall, when he went there. He looked agitated, and though he treated me with more tenderness than usual, since our misfortune had burst upon him, yet he refused to tell me the result of his consultation.

In the evening, however, after a long silence, he suddenly turned round to the table where I was actually endeavouring to discipline my fingers to the use of a needle, and said, ' Ger-

trude, will you be contented to remain here in acknowledged embarrassment, shut up from the world, and endeavouring with me to save and to pay; or, will you for a time return to your father and mother? You know they will receive you with open arms; and you can there have the comforts so necessary to you and our poor little children. I really think it will be the wisest course to ask an asylum from them; for how can you adapt yourself to our present circumstances?’

‘If you do not actually drive me from you, my dear Edward,’ I replied, ‘if you will suffer me to remain with you, poignantly as I feel the reproach implied in your proposal, it will be my only consolation to share your difficulties, and to expiate my follies by a devoted economy.’

‘I felt—I knew that would be your decision,’ said he, as a tear stole down his cheek. After a few days had passed, Mr. P.’s old friend came to see us; not by any means an agreeable surprise to me, for I dreaded his contempt and rebukes, and I was still but a wayward and only half-humbled creature.

‘Well!’ said he, entering the room, ‘I believe I was unreasonable in the plan I proposed; so I am come to try if we can do better. But what did you think of it, madam?’

I told him that it had not been confided to me.

'How so—did not Edward tell it you? How was that, Mr. P.?'

'I did not like to give my wife the pain of knowing that you could have thought so unkindly of her; and as I had no hesitation in regard to my decision, it was not necessary to suggest to her such a cruel idea.'

'It was very generous forbearance on your part,' said he, 'for you left me full of indignation. I will tell you myself, Mrs. P. I have lately inherited an estate in Jamaica; I am unable to take possession of it in person, and I proposed that Edward should go as my representative, and manage it for me, as long as his affairs are recovering here. But I made it a positive condition, that he should give you over to your parents' care, and quietly disencumber himself of a useless, extravagant wife. That, madam, was my scheme. You are shocked, and turn pale; but you must allow that it was very natural advice. However, I begin to think it not quite right to propose such separations, nor is it just to refuse you some trial of amendment. I have come now, therefore, to renew my proposal, without that condition, and to offer a salary double that which I first named. I will undertake the management of your property here; and for this house, I will allow you a fair rent. And now, madam, consider this well, and don't let yourself

be angry at me, for I am an old man who deals in plain truth and plain sense.'

Wounded, as I had often been, by the harsh things this old man had said to me, yet his blunt generosity now overcame every feeling but that of gratitude; and before he left us the next day, everything was arranged with him for our immediate departure. The demesne and all our real improvements were to be kept up; the whole income was to be applied to the payment of the debt, which he undertook to discharge by regular instalments; and our books and some other extravagant purchases, on which I had lavished so much money, were to be sold if he found it necessary.

In parting from us, he took my hand, for the first time since we had been acquainted, and said, 'I do now believe that you are attached to your husband—I am glad you are going with him; and I trust the experience you have so dearly bought, will be of lasting use to you both. I have one word more, and I have kept it for the last, to make the deeper impression. Remember these rules, fix them in your mind, and repeat them daily.

'Buy nothing that you do not absolutely want; and never go in debt for any thing you do want, be it ever so necessary.

'Waste nothing.

'Let ORDER preside in every part of your house.

‘Remember, that a drawing-room, though elegantly furnished, is disgusting, if untidy.

‘It is no excuse for bad dinners and comfortless rooms, that the mistress is engaged in her laboratory mixing gases, and trying experiments that are known to every apothecary’s apprentice. Women, indeed, may store their minds with knowledge, but then their homely duties must not be neglected.

‘Let me hear, that when your husband returns home, after a busy morning, he finds a cheerful house, and a smiling wife; or, as sweet Allan Ramsay would say, ‘a blazing ingle, and a clean hearth stane.’’

With heartfelt sorrow I quitted the place where I had spent the happy beginning of my married life. It seemed as if I was leaving every thing that was dear, and that I never could again enjoy the tranquil life Edward and I had led for six years. Next came the parting with my children and my parents! But I will not touch on the painful struggle between different duties; nor will I mention the distress of mind which my dear father and mother suffered, in consequence of my imprudence. I consigned my dear boys, rosy, smiling, little, lively creatures, to my good mother, and she has truly done them justice.

Our passage to Jamaica was most favourable. Mr. P. took possession of the San Pedro planta-

tion, in the name of Mr. Crispin, and we were immediately settled in the dwelling-house attached to it. It consisted of one story only, as most of the houses in that country are so built, to preserve them from hurricanes and earthquakes. A viranda extended along the west and south sides, ornamented with oleanders, African roses, grenadillas, passion flowers, and other lovely plants, trained to the pillars. To the north-west lay a flower garden, inclosed by a hedge of the Barbadoes flower-fence. At ten or twelve feet from the ground, the stem of this beautiful and extraordinary plant divides into several spreading branches, armed at each joint with strong crooked spines; and every branch terminates in a loose spike of flowers, which are something like carnations, and which combine the most glowing mixture of red, orange, and green, accompanied by a strong but agreeable smell. I shall mention only one more feature of this charming spot: the garden was sheltered by a large *Pimenta* grove; and, as you are acquainted with this beautiful species of myrtle, which produces the allspice, you may imagine how delightful I must have found its fragrance and its shade in that sultry climate.

The violent resolutions I had made to abjure my former errors, and to devote myself to my household duties, now led me into the opposite extreme. I entered into every little detail with

such indefatigable earnestness, and, ignorant of the manners and customs of the West Indies, I made such an infinite number of teasing regulations, that I completely worried my servants and slaves; and even Mr. P., I do believe, thought this extreme the worst. I became so fussy and so busy, that I thought I had time for nothing else, like the Norwegian ladies, whose whole lives are absorbed in domestic drudgery.

One circumstance, however, greatly annoyed my feelings—the being surrounded by slaves. Though they did not, in general, look unhappy, and though they enjoyed many comforts, yet the whole system excited my indignation. You know I had never learned to control or conceal my sentiments, and I now took every opportunity of expressing them with such silly enthusiasm, and so publicly, that I not only offended all the whites, but injured the poor negroes themselves. My imprudent sympathy not only made them feel their degraded situation the more acutely, but materially helped to inflame that spirit of discontent which, more or less, must always accompany slavery; and I really tremble in reflecting how much I may have been accessory to the events which afterwards happened. Yet you will be astonished, Bertha, when I add, that such was the perverse inconsistency of my character, that while overflowing with compassion for these poor creatures, I was a most arbitrary mistress

to those who were among our domestics, and tyrannical over all who were under my influence. I had established an evening-school for the slaves, when their work was done ; I did really pay it unremitting attention, and fancied that I found great pleasure in being useful ; but I could not bear to have my benevolent intentions thwarted : those who were negligent in their attendance excited a stronger feeling than displeasure ; and I blush in confessing that the task-master found it was his interest to treat those who had displeased me with increased severity.

One of the females who worked in the plantation had a very engaging daughter ; she had a good figure, spoke English tolerably, and had a quickness and intelligence which particularly pleased me. I had a great wish to have this girl about my person, and at last obtained her, though against her mother's will. She lived in the house, and was a most useful and good-natured creature ; and the rapidity with which she acquired all the knowledge that I could teach, fully justified the high opinion of her that I had formed.

Sometimes, in the intervals of my economical fever, I amused myself in making little collections in natural history ; and she endeared herself extremely to me by the zeal with which she entered into all my pursuits. Birds, insects, beetles, spiders, reptiles, were all caught by her

dexterity ; and the tenderest plants and flowers were laid on my table as fresh as when they were pulled ; so that Mr. P. and I were able to examine, at our leisure, all the natural productions of the island. In short, during more than a year and a half, this blameless and innocent girl, Nanina, continued high in my favour, and was treated more like a daughter than a slave. She really loved me, and her efforts to please me were most assiduous. But I had a temper which had never been controlled in youth, and which was still unmanageable. Caprice alone governed it, and I began to grow tired of poor Nanina. Perhaps she might have been sometimes rather too familiar in her manner, but if so, it was my own fault. Always in extremes, I now became dissatisfied with everything she said or did. If she appeared hurt at this unaccountable change of conduct, I was still more angry ; and one day, that she threw herself at my feet, and with tears in her eyes remonstrated against some unjust accusation, I barbarously spurned her from my chair, and ordered her never more to enter my room. Alas ! how quickly does the spirit of injustice grow ; the next day I missed a favourite ring, and I accused her of stealing it !—Yes, I suspected poor Nanina, who had been invariably faithful, and whose principles I well knew had been proof against many far greater temptations.

I learned that Nanina had gone to confide her griefs to her mother ; and as she did not return, I became so incensed at her for leaving me, as well as at her family for encouraging her to stay away, and I spoke of them with so much bitterness to the overseer, that he lost no opportunity of treating them with rigour. No attention, however, was paid to my positive orders for her return : she was not with her family ; to all inquiries about her, they preserved a stubborn silence ; and it was notorious that the unjust harshness of the overseer to them all was the effect of my resentment. Several weeks elapsed without any tidings of her ; and, irritated by what I considered her obstinacy, I determined to communicate the whole affair to Mr. P., in order that he might enforce obedience to my commands. I did so, and never shall I forget the horror and astonishment he expressed at my conduct. At first I was vexed and mortified by what he said ; but when he calmly retraced to me all the circumstances of the case, contrasting my professed sensibility with my real inhumanity, and dwelling not only on the capricious extremes of my affection and hatred for Nanina, but on the accumulated cruelty of suspecting her without cause, of punishing her without proof, and of revenging my quarrel with her on the whole family, I sunk into his arms, I saw and acknowledged all my odious errors, and would have done anything to

compensate the poor girl for my base injustice, if she could have been found.

All this took place in the beginning of summer ; and in the middle of the hottest part of that season, Mr. P. was obliged to go to Spanish Town, which was fifteen miles distant, about business. The day passed heavily, the sultry air oppressed me, there [seemed to be an unusual stillness everywhere ; the slaves even appeared to work in sullen silence, and I scarcely heard a sound but the buzz of some insect, or the angry chirp of the humming-birds, as they quarrelled about the flowers at my window. My thoughts turned mournfully upon my late conduct, and upon the severe but just expostulations of my husband. They did indeed oppress my heart ; and, in some measure to relieve myself, I went, in the afternoon, to the school, but I found it locked and no creature near it. There was a mountain-path near the Pimenta grove, where we used sometimes to walk late in the evening to enjoy the land breeze ; and taking a book which happened to lie on the sofa, I strolled through the grove and ascended slowly from the valley. The hills in that country are covered with woods which never lose their verdure ; and after musing for some time on a magnificent group of the stately cabbage palm, the tall cedar, and the wide-spreading mahogany, I sat down under their shade. At length I opened my book, and

the very first thing I saw was my long-lost ring! I quickly recollected that many weeks before, I had put it in there to keep the place open, and I felt myself so shocked at my unworthy suspicions of Nanina, and so angry at myself, that I was quite overcome. But gradually the breeze revived me, and I burst into tears. At that moment,

When sunk by guilt in sad despair,
Repentance breathes her humble prayer,

I was startled by the sound of hurried footsteps, and Nanina herself appeared before me. She stopped, hesitated—then seized my hand and pressed it to her heart. ‘Oh! joy, joy,’ said she. ‘Nanina thought never more see you, and now me search for you, and no find you in house.’ I was painfully glad to see her—I hastily rose to take her home, and began to express my feelings, but she interrupted me, and said, in the most urgent tone, ‘This day me make escape, and run to tell mistress not to stay in home to-night—they all rise this night, and go everywhere for mischief, but first kill mistress, or make her slave.’

However startled by this alarming speech, I immediately proposed to return home to save my husband’s papers and to tell the servants to escape.

‘No, no, no,—too late,—come with me, me put you safe, but no talky now,—come quick,—come silent.’

As we hurried along through the forest paths, I could not help saying, 'Nanina, I was unjust to you—I accused you of stealing;—how comes it that you are so kind to one who has used you so cruelly?'

'That is what me learn from the book you gave me, and taught me to know—me never lose that book;—that book say, forgive your enemy, do good to him that persecute you. Yes, you call me teef, but you be killed dead, if Nanina no come save you, and Nanina forget all but that you were once good mistress.' She grasped the hand I had laid on hers, as she said this, and I felt her tears drop on it. Oh, what an exquisite moment! I besought her to let me send intelligence to meet Mr. P., but the faithful creature had already sent a trusty friend to warn him of the danger, and to assure him of my safety. She hurried me on—it was dark when we reached the river, and no canoe was to be seen; but we walked along its banks for some distance, when, to my great surprise, it suddenly disappeared. I then recollected hearing that in one spot the San Pedro river dipped under ground; and there Nanina had purposely brought me, that we might cross to the opposite bank, without the assistance of a boat. At last, after many hours' walking, and when I was scarcely able to move, we arrived at one of the reed huts which the negroes inhabit. A man and woman received us;—they said some

words to Nanina, which I could not understand, but they looked good-naturedly at me, and laid their hands on their hearts.

Now that we were apparently in safety, and that we could venture to speak at ease, Nanina told me what had happened during the long time she was absent. The day on which, in vexation, she had gone to complain to her mother, she found a stranger in the hut. This was the famous Apakong; he was one of the descendants of the Maroons, who had formerly been so troublesome, and he fully inherited their fierce, discontented spirit. He had instigated the slaves in our neighbourhood to rise against their masters. My injustice to Nanina and her family was an additional pretext, and fearful that her mother might suffer her to return to me, and thus, perhaps, betray their plans, he took her away as a hostage, and till that day had watched her closely; but a general muster of the insurgents had happily given her an opportunity of escaping from his less vigilant wife.

Nanina left me at early dawn, entreating me not to stir from the negroes' hut till she returned. Hours passed in the most intense anxiety, and no tidings came. I knew not what the poor negroes said, but I saw they were deeply anxious, listening to every sound, and watching in every direction. They placed food before me, but I could not eat. They brought me a branch

of a pimenta tree, which overhung the hut, to revive me by its smell ; but it reminded me too strongly of the dwelling at San Pedro, which I had begun to love, and of my dear husband, whom, perhaps, I should never see again. My thoughts flew from that to my former home on Ulleswater, and then still farther back, to the home of my youth, and to those dear parents whose over-affection for me had been their only fault. Alas ! thought I, how will they feel, if ———. But this train of bitter reflections was suddenly interrupted by loud yells, which appeared to be rapidly approaching. I was preparing to meet my fate with resignation, when my two poor negro hosts quickly placed me in a corner of the hut, and, covering me over with reed and palm leaves, made a sign of silence. An immense crowd surrounded the hut, and I heard many loud and angry voices inside ; but it was Nanina for whom they asked ; she was the object of their pursuit ; and, full of revengeful eagerness in their inquiries about her, they did not observe the suspicious heap of reeds.

They were not half an hour gone, when poor Nanina arrived, looking quite worn down by fatigue. She had gone to obtain intelligence, and having heard of the insurgents' visit to the hut, and fearing their return, she came to remove me to a place of greater safety. How or when we arrived there I can scarcely recollect ;

and what took place afterwards I can still less remember, for I fainted more than once with fright and fatigue. I know that there was fighting close to me—the horrid yells are still in my ears ; and I think I can remember clinging to Nanina when she was seized—a loud shout that was given soon afterwards—and then finding myself again in silence ; and I well remember that Mr. P. himself came into a cave where I was lying, and took me home.

And what a scene presented itself there ! The house partly burnt, the furniture destroyed, the gardens ruined, and every species of devastation committed, for which there had been time or means. My brain, which was already bewildered, now completely gave way. I thought I was the cause, not only of all this destruction, but of the death of Nanina, my preserver, though she was then with me. Nothing could calm me ; and I continued for a long time delirious.

I have since been told, that when Nanina's messenger arrived in Spanish Town, there was such a general conviction that the insurrection of the slaves was a false report, that much time was lost ; and before the military were detached, the rebel negroes had done incalculable mischief to the San Pedro and some neighbouring plantations. At last the troops arrived, and Mr. P. with them ; and after a short skirmish, the negroes threw down their arms, and submitted.

The ringleaders were taken ; and one of them acknowledged to Mr. P. that they had been a long time secretly trying to excite a spirit of rebellion amongst the slaves ; that they agreed not to do any mischief to the San Pedro plantations, because Mr. P. had always been lenient and considerate ; but that afterwards they felt so much the harshness of *my* conduct, which became so different from what it had been at first, that their vengeance was particularly directed to our house.

My mind continued in such a state for many weeks, that Mr. P. determined to try change of air and scene ; and, as soon as the necessary measures had been taken to repair the losses at our plantation, he prepared to take me to Antigua. I was insensible to everything, and can only tell you the circumstances since detailed to me. The voyage began well ; but, in a few days, a hurricane arose, which dismasted the vessel, and wrecked us on the coast of Hayti. The crew were saved with difficulty, but everything else was lost, and we were in a lamentable situation, prisoners, absolutely destitute ; and even Nanina and our man-servant were separated from us. When I missed her, my former conviction of her death returned with double violence ; and I became still more unmanageable. She found it very difficult to convince the people of Hayti that, though a slave, she did not wish

for the liberty which they offered ; but, at last, after much explanation and entreaty, Mr. P. persuaded the government to let her return to our quarters. When she appeared, I knew her, and tenderly embraced her ; I also knew my affectionate husband, who had so long been my only nurse. This momentary return of reason was of short duration ; it was followed by a fresh access of fever, and all hope of my recovery seemed now to have vanished.

A favourable crisis, however, came. I awoke to restored consciousness ; and the first sounds that I heard were from my husband, at my bedside, uttering his pious gratitude to heaven, in a low voice. I scarcely knew the cause of his emotion ; but afterwards, when I witnessed his daily and fervent thanksgivings, and became sensible of the cloud which had darkened my understanding, I felt my heart more truly and more deeply touched by religion, than it had ever been, even in the period of my highest enthusiasm. I may, indeed, say, that ‘ The Lord put a new song into my mouth, even a thanksgiving ;’ and I sincerely prayed that God would enable me to repent of my sins and follies, and that he would turn my whole heart to gratitude and humility.

My trials, however, were not yet over. Every day, indeed, made me more and more conscious of my former errors ; and every day I felt more penitent ; but I was now to act. Anxiety, want

of rest, privations of every kind, and probably infection, soon shewed their effects on my faithful companions ; and both yielded to the same horrid fever. Experience of their tender care, during my own tedious recovery, had taught me what to do ; and duty, love, and gratitude, gave me strength. I who, till lately, had not known what bodily exertion meant, was now actually the only attendant on these poor patients ; and, I thank God, my humbled spirit was heedless of all trouble !

A French physician, who had been allowed to remain at Hayti during the political changes there, was permitted to visit and prescribe for us. I never can forget his compassionate kindness ; and it touched him so much to see me, still very weak, going through every menial work, that he promised to lend me one of his own servants ; but government interfered, and, for what reason I could never divine, forbade this act of generosity. I am glad of it ; for a strong practical lesson was very useful in completing my reform. My anxious cares, however, were ultimately rewarded by the recovery of Mr. P. and of Nanina ; and, as soon as we were able to leave the miserable house where we had been imprisoned, our good physician obtained leave to remove us to a better situation ; and he even ventured to supply us with money, for which we were sadly distressed.

After a long and painful detention, the same active benevolence obtained our release ; and, as soon as we could hire a vessel, we departed. My kind husband offered to take me to Antigua, and to let me reside there, in the idea that I might have a horrible impression of Jamaica ; and he proposed to visit San Pedro himself, from time to time ; but I would not consent : the days of folly and selfishness were past—I now knew and felt my duty. We landed in Jamaica, and there a fresh misfortune awaited us. The person who had been appointed to the care of the San Pedro plantation, during our absence, refused to give it up ; he alleged that he had been acting under the direct orders of the proprietor ; and more than one reference was made to Mr. Crispin, before all the tedious difficulties could be overcome, and before the law authorities would interfere to dispossess him. To us, who had no ready money, a lawsuit was difficult to manage ; and a very long time elapsed before Mr. P. was completely reinstated.

A severe illness, under which Mr. Crispin had been labouring, was a great additional source of anxiety to us, and had materially helped to protract the above affair ; but, shortly after its termination, we received a most kind and fatherly letter from him, announcing his perfect recovery ; but intimating that he considered his illness as a warning to ‘ set his house in order ;’ and

inclosing a deed of gift to Mr. P. of the whole Jamaica property. He said he had always intended to bequeath it to him, but that he preferred giving it then, while Edward was on the spot, that he might make whatever arrangements he liked previous to his return to England. And this he hoped might be soon, as he wished, before he died, to see us once more, and to restore to Mr. P. his Ulleswater estate, which had nearly paid off all his debts. He also sent a considerable sum of money to reimburse our expenses in the lawsuit, and thus effected a sudden change in our circumstances, from poverty to comparative affluence.

It was long since we had had money at command; and the first use Mr. P. made of it was to enable me at once to visit the dear friends from whom I had been so many years separated, without waiting for the final arrangement of his affairs. I need scarcely tell you that, the moment the property was ours, we gave Nanina her freedom. I had intended to have proposed her remaining with me, but I learned that there had been a long attachment between her and a deserving young man; and, before we left Jamaica, I had the pleasure of seeing the faithful girl happily settled.

Just then the Phaëton was ordered to Brazil with despatches, and to proceed from thence to England. Captain M. was nearly related to

Mr. P., and offered me a passage, which, though much longer, was much more agreeable than if made in any other way. I need not tell you, Bertha, how greatly I enjoyed the time we remained at Rio, and how happy I was to have you for my companion during the remainder of our voyage.

Thank heaven, I found my dear father and mother well and strong ; my children, too, had just come home from school, for the vacation, and my happiness would have been complete, had my dear Edward been with me. My boys have fine, open, generous minds, and I trust that, in their education, I shall take warning by my own early faults.

From this little history of my past life, you will perceive, my dear Bertha, how much reason I have to be grateful for the afflictions with which Providence thought fit to correct me ; and, though your education has fortunately been very different from mine, still, this account of my follies, and their consequences, will point out numerous dangers to avoid, and new motives for continual watchfulness : every page of it will shew you the necessity of a vigilant self-control, and will, I think, amply demonstrate the value of homely virtues and of homely knowledge. Do not, however, imagine, that I seek to depreciate the value of scientific or literary pursuits, or that my love for them has diminished ;—far

from it;—I would only keep them in their right place; for I have at last learned that the *useful* and the *intellectual* embellish each other; and that the female character is more or less imperfect if deficient in either.—G. P.

11th.—The dormouse seemed less inclined to sleep during the last return of frost, than before; and since the weather has become a little more mild and warm, it seems to have laid aside its sleepiness almost entirely. During one or two slight frosts which lasted for only a day or two, it slept constantly; and I think I may say from all our observations, that whenever the thermometer, which my uncle has attached to the cage, falls to 42°, the dormouse becomes inactive; and if it falls any lower, he remains insensible. When the warmth of the room rises to 47° he is affected by the slightest touch, and is sure to waken in the evening and to eat heartily of his store, which I keep supplied with nuts, biscuits, and a little milk and water. When he is too lazy to put his mouth down into the cup, he has a very amusing method of drinking; he dips his tail into the milk, and then draws it through his mouth. Last night he was so much alive that he very expertly repaired his nest, which had been a little deranged. On the whole, as my uncle says, it appears, that as soon as the necessity for sleeping is removed, by artificial

warmth and plenty of food, the torpid propensity of this little creature vanishes.

My aunt remarked that there are many well-known facts of animals being compelled by circumstances to relinquish their strongest characteristics; for instance, the hyena lives on the roots of *fritillary*, in the unfrequented parts of Africa; but, in the neighbourhood of inhabited places, he feeds on carrion:—and the pied fly-catcher, which lives on soft seeds in this country, is well contented, in Norway, with flesh dried in smoke.

The rain, which was incessant for two days and nights, stopped yesterday, and a nice soft wind, with a warm sun, has so much dried the ground, that we have been out almost all the morning. I find that spring is beginning to advance. The buds of several trees are visibly enlarging, though it will be many weeks before they burst; the catkins of the hazel, which appeared, during the winter, like little short green spikes, are now lengthened, and so much more open, that each floret is to be seen separately, though none are yet expanded. When we were rambling through the hazel thicket, Mary showed them to me; and also the little buds which contain the flowers that afterwards produce the nuts, scattered up and down on the branches. It is curious that these flowers are so carefully pre-

served in buds, while the catkins are exposed without protection, during the whole winter.

The flower-buds of the peach-trees are much swelled, the scales are almost separating, and, in some, there is even a streak of red appearing.

The tufts of leaf and flower-buds on the pear-trees begin to show themselves more distinctly; and, on the larch-trees, the little brown lumps are now growing larger, and preparing to let the nests of imprisoned leaves burst forth.

It is very odd how many interesting things are passed over, and not observed. There was a young lady here last week who lives in the country, and yet had scarcely noticed any of these small circumstances in Natural History, which distinguish the changes of the seasons, though she diligently walked out every day, for two hours, round the garden and shrubbery.

Notwithstanding my love for the rich and beautiful vegetation of Brazil, I do like the seasons here, and the sort of feeling of expectation that winter, dark and dreary as it is, gives of the welcome return of spring, with all its beauties.

12th, Sunday.—My uncle, in conversing this morning about the peculiar situation and circumstances of the Israelites, said that the beneficence which graciously condescended to detail

all their smaller duties in the law, might be compared to the cloud which continued to be their daily guide in the wilderness, directing them when to halt, and when to advance ; for the law was their sure guide to lead them blameless through the journey of life, could they but have been obedient to it, and restrained their unruly and stubborn dispositions.

‘ But, perhaps,’ he continued, ‘ there is not anywhere in the history of man a stronger proof of the corruption of his heart, and, at the same time, of the perfect free-will bestowed on him, than in the simple facts recorded in the history of the journey of the Israelites across the desert ; when, at the very time they were under the immediate guidance of God, they so frequently murmured, and even rebelled, against his commands ; thus exercising their own will, notwithstanding the threats and prohibitions, as well as the promises, conveyed to them by Moses.

‘ The book of Numbers, you know, is so called because it contains an account of the two numberings of the people ; the first of which took place in the second year after their departure from Egypt ; and the second, in the plains of Moab, near the conclusion of their wanderings. It comprehends about thirty-eight years ; but the principal historical events which it records happened at the beginning or the end of that period,—such as the death of Aaron, and

the very interesting narrative of Balak and Balaam's insidious attempts. It also describes the consecration of the tabernacle, and recapitulates the forty-two journeys of the Israelites in the wilderness, under the miraculous guidance of the cloud.

' This book also contains several instances of the prompt severity with which God punished the rebellious murmurings and ungrateful seditions of the people. But amidst the exemplary terrors of those judgments, it sets forth, on every occasion, the continuance of his fatherly mercy and goodness, in providing for their wants, in protecting and defending them, in holding out the consoling offer of future restoration to his favour, and particularly in the beautiful and comprehensive blessing which he appointed to be pronounced by the priests, and to which, lest any body should despise it, because uttered by a mere mortal, he annexed this gracious and distinct promise, " and I will bless them."

' The blessing *, probably, extended in its full meaning to after-ages, and seems to be capable of a more comprehensive interpretation than what appears in our translation. For it is very remarkable, that the name of Jehovah, which is three times repeated, has each time, in the original Hebrew, a different accent. Some commentators think that this refers to the three persons

* Numbers vi. 24, 25, 26.

of the Trinity ; and that it has a strictly parallel signification to the form of baptism which our Saviour established in " the name of the Father, and of the Son, and of the Holy Ghost."

' The three parts of this benediction, they say, will be found to agree respectively with the attributes of Three Persons. The Father being the source of all blessings and preservation, temporal and eternal. Grace and illumination coming from the Son, through whom we have the light of all true knowledge. And Peace, that is, the peace of conscience and inward tranquillity of mind, being essentially the gift of the Spirit, whose name, St. John says, is the Comforter.'

13th.—Everything relating to the interior of Africa is so interesting, now that such efforts are making to explore it, that I think you will be amused by a few lines from Mollien's Travels, about a kingdom called *Fonta-diallon*.

He says, that the villages are like camps ; there are but few cattle, and those of diminutive size ; horses are unknown, and the ass on which Mollien rode, spread terror through the country. There is not sufficient prey to invite the lion ; and the surrounding mountains have never been crossed by the elephant : but hyenas and panthers are abundant ; and monkeys people the woods.

The riches of the inhabitants consist in slaves, and they have some very singular establishments for them, which seem to show a much greater degree of humanity than we find in any other part of Africa. I will copy Mollien's own words.

‘ Les Rumbdés sont des établissemens qui font honneur à l'homme de l'humanité. Chaque village, ou plusieurs habitans d'un village, rassemblent leurs esclaves, en leur enjoignant de se bâtir des cases voisines les unes des autres ; cette réunion s'appelle *Rumbdé*. On choisit un chef parmi les esclaves ; ses enfans, s'ils en sont dignes, occupent sa place après sa mort. Ces esclaves, qui n'en portent que le nom, labourent le champ de leurs maîtres ; et lorsqu'ils voyagent, les suivent pour porter leurs fardeaux. Jamais on ne les vend quand ils sont parvenus à un âge un peu avancé, ou qu'ils sont nés dans le pays ; agir autrement, ce serait causer la désertion de toute la Rumbdé ; mais celui qui se conduit mal est livré au maître par ses camarades, pour qu'il le vende.’

14th.—It is only a fortnight since I first observed snow-drops pressing up through the snow. Now, at every step, I find the early spring-flowers displaying themselves ; and myriads of gay crocuses, yellow, white, and purple, are bursting every day through the grass of the little lawn

under the library windows. My aunt is going to paint a group of them, which I am to have the pleasure of gathering for her. Hepaticas, of all colours, are unfolding their little flowers, which have been so long coiled up, waiting for the gentle influence of spring. Periwinkle, and even polyanthus, are beginning to blossom; and the sweet-scented mezereon bushes are thickly covered with the flowers which I saw quite formed in their little buds five months ago.

The weather has been for some days as soft and mild as it was cold and harsh a week since; and this has rapidly brought out both birds and plants. Even my little dormouse has been more lively.

I have been reading a description of winter, which gives a more melancholy idea of it than I think it deserves.

‘ Winter, season of death, is the time of the sleep, or the torpor, of nature; insects without life, reptiles without motion, and vegetables without verdure. The inhabitants of the air destroyed; those of the water inclosed in prisons of ice; and even the terrestrial animals, in some countries, confined in caverns and holes.’

I do not think that, in the depth of winter, all the little living creatures were so torpid as they are thus described; but the author nicely says, afterwards, ‘ The return of the birds in spring is the first signal of the awakening of nature.’ I

agree with him in that, as I have for some days observed that several birds have been singing in an under voice, as if trying their powers; even a thrush, early as it is, warbled a few low notes, for Mary and me, this morning. But there is a little brown bird, with a bluish, ashy-coloured neck, that for two or three weeks I have constantly heard, as it sits on a fir-tree near my window, loudly repeating its sweet, though unvaried song. It is the winter fauvette, or hedge-sparrow; which, however, does not belong to the sparrow tribe. The fauvette is described as a lively, amiable bird, very active, and to be found everywhere; in gardens in thickets, and hedge-rows.

Numbers of insects, too, may be discovered. In our walks last month, we found many under the bark of trees, or concealed in the moss; and Mary told me that some of these are scarce in the summer months. We have often brought home, in our pocket handkerchiefs, great tufts of moss from the roots of trees; and, by shaking it over white paper, we have easily collected the insects.

I forgot to mention the golden saxifrage, or stonecrop, with which the shrubbery is bordered, and which is just beginning to flower; and in some of the hedges the sloe is coming into bloom. But, Mamma, even in the depth of winter, there was nowhere that appearance of death described by that melancholy writer; for the bramble

retained its leaves, and gave a thin scattering of green to the hedges; while the berries of the wild rose, the euonymus, and the hawthorn, along with the pretty red dog-wood, gave everything a cheerful look.

I have often thought of the walk I had with my uncle in November, and of the quantity of things which he taught me might be found to observe, even in the worst seasons.

15th.—All this winter we have observed great numbers of the pretty little lady-bird, or *coccinella*, clustered together in a privet-hedge; they are generally collected at the joints of the branches, and at first I imagined they were red berries. Mary never observed so many before, and she therefore supposes that the *aphis* must have been uncommonly abundant last autumn. She tells me that the lady-bird is of great service—for in its larva state it feeds entirely on aphides; and when these mischievous grubs are very numerous, the multitudes of their pretty little destroyers always seem to increase in proportion. In 1807, they covered the cliffs at Brighton in such swarms, that the inhabitants were almost alarmed, not being aware that they came from the neighbouring hop-grounds, where their larvæ had been usefully employed in preying on the *aphis*, which had committed such ravages among the hop-plants, and which is there called *the fly*.—

Their utility is so well known in France, that they are almost held sacred there; and, indeed, they are so pretty as to be favourites everywhere.

Just in the same manner as the locust-eating thrush accompanies the locusts, so the *coccinellæ* seem to pursue the aphides: whether the latter cross the sea is not known; but the *coccinellæ* certainly do, as they have often alighted upon vessels at sea.

17th.—I have just read a passage in Kalm's Travels in North America, which seems, in some degree, to confirm that opinion of Dr. Walker's, about the flowering time of foreign plants, which my uncle mentioned last week.

'The crab-trees opened their flowers yesterday; whereas, the cultivated apple-trees which were brought from Europe, had already lost theirs. The wild cherry-trees did not flower till May 12th; but the European ones had opened theirs by the 24th of April. The walnuts of this country had neither leaves nor flowers, when the European kinds had both. Hence it appears that the trees brought over from Europe, of the same kind with the wild trees of North America, flower much sooner than the latter. I cannot say the cause of this forwardness, unless it be that they bring forth their blossoms as soon as they get the degree of warmth to which they have been used in their own country: it almost

seems as if the native trees of this country are directed, by *experience*, not to trust to the first warmth of spring, while the flowers of the European trees are often killed by the late frosts.'

I read this passage to my uncle, and asked him if these plants did not seem almost to have instinct?

He smiled, and said, 'I can give you another remarkable fact. The wild potato, from Valparaiso, flowers in the garden of the Horticultural Society in October, which you know is the spring of South America. All these curious circumstances are manifest proofs of the wisdom of Providence,' who has impressed on plants and animals the habits proper to the situation in which he placed them.'

I afterwards asked my uncle if the American fruits were very late in ripening, as the blossoms are so long kept back by winter.

'No,' he said, 'the summer is very warm, though the winter is long and severe; and, as animals become more sensible to heat, after being previously exposed to cold,—for the same reason that your hands glow on coming into the house after having been rubbed with snow—so vegetables seem to be excited to a greater degree of energy by the previous intense cold. Vines, in grape-houses which have been exposed to the open winter air, become forwarder and more vigorous than those which have been kept shut

up in the house. In the northern latitudes, after the dissolution of the snow, the rapidity of vegetation would astonish you.

‘Clarke mentions in his travels in Scandinavia, that it is by no means uncommon for barley to be reaped in six weeks after it has been sown; for in summer the sun is so long above the horizon there, that there is scarcely any intermission of the warmth of the soil during the night.’

19th, *Sunday*.—‘While we are engaged in considering the history of Moses,’ said my uncle this morning, ‘I think we should dwell a little on a very striking part of his character, in order to imitate it, though, indeed, we can never be tried like him, in having the guidance of such a wayward and stiff-necked people. Bertha, guess to what quality I allude.’

‘Perhaps to his meekness, which the Bible mentions as being remarkable,’ I replied.

‘Yes; meekness and spirit united. No man could have given more proofs of his courage than Moses. He slew the Egyptian who was killing one of his Hebrew brethren: he beat the Midianite shepherds, though alone and unsupported: he boldly remonstrated with Pharaoh in his own court, and feared not all the power of Egypt; but more than all, when God commanded him to approach, he ventured amidst all the terrors of Sinai: and yet that spirit

which made and knew his heart, says, "He was very meek, above all men upon earth." Mildness and fortitude may well lodge together in one breast; it is not the fierce and cruel who are the most valiant.

' In the sedition of Miriam and Aaron, we see a beautiful example of his meekness, and of that true magnanimity which arises from it; and those very qualities are given as the reason why God avenged their ingratitude to Moses. Their trial must have been the more painful to him, because the enmity which he endured was from his own nearest relations. Yet he interceded for them, and God remitted the punishment which they had justly incurred. There, my children, is a pattern for you of that forbearance and generosity, which our Saviour afterwards so strongly commanded his disciples to exercise.

' If Moses himself excited the anger of the Lord at Meribah-Kadesh, by the distrust which induced him to strike the rock twice, as if doubtful of God's omnipotence—if even he could be guilty of such weakness, or could be provoked by the people to "speak unadvisedly with his lips," how much more then do all of us require a continual watchfulness of our hearts, lest we give way to the same kind of ignorant and presumptuous scepticism!

' The punishment of Moses, by prohibiting

him from leading his people into the promised land, was peculiarly mortifying; and afforded an exemplary lesson to all Israel of the necessity of obedience, faith, and humility, to secure the favour of God. How severely Moses felt this infliction, and how meekly he bore it, appears from his humble, and it would seem repeated supplications to the Lord to reverse the sentence; but it was reserved for a greater than Moses to teach His disciples how to pray on such an occasion: "O my Father, if it be possible, let this cup pass from me: nevertheless, not as I will, but as Thou wilt."

'I think I have noticed to you, on a former Sunday, the perfect candour of Moses; in the present case it is again conspicuous. His offence, his punishment and his entreaties are frequently alluded to in the Pentateuch, but are totally omitted by Josephus. In the original narrative they are mentioned as if necessary to explain the whole truth—they are expressed in sorrow and humiliation;—and the ingenuousness with which both the crime and the disgrace are recorded by himself, form a striking contrast with the suppression of those facts by that cautious historian in describing the character of the great legislator, to whom he looked with so much reverence.'

20th.—Several insects of different kinds ap-

pear now on the fruit-trees, and are already beginning to do mischief to the little buds—some to those containing the leaf, and some to those of the blossom. When I heard this, I said, that if they could be picked off the blossoms, it would not signify much if some of the leaves were destroyed; but my uncle reminded me that the leaves are necessary to the nourishment of the fruit; for unless there are leaves to prepare the sap for that purpose, the fruit withers away.

It has been found, he says, by his friend Mr. Knight, that where a peach branch had only flower-buds on it, the grafting a leaf-bearing twig to its extremity, so as to produce leaves, was of great benefit to the young fruit. Mr. K. having also observed that a melon plant began to decline, which apparently had sufficient foliage for the nourishment of its fruit, he examined the plant more carefully, and discovered that a runner had grown out of the frame at one end, with an additional melon on it. He took this one off, and the rest of the fruit again flourished.

My uncle is going to try a new wash, which can do no injury, and which has been much recommended to him for destroying the various grubs and insects that are so mischievous to the fruit-trees. He sent yesterday to Gloucester, for some of the water through which coal gas had been passed; and he had three gallons of it

mixed up to-day with one pound of flour of brimstone—to this was added soft soap, enough to make it adhere when laid on with a painter's brush. It was mixed over the fire, and it may be done so with perfect safety, he says, as it is not inflammable.

Many insects deposit their eggs in the bark, or in the young buds; and it is their larvæ or caterpillars that do the greatest mischief. The *aphides* injure all the varieties of plum; and there is a *coccus* sometimes in such quantities on those trees, that in summer every twig is thickly beaded with little red, half-round specks. In spring the larvæ exhaust the trees by sucking out the rising sap. The grub of a little brown beetle destroys the blossom of the pear-trees; and a saw-fly injures the fruit so as to cause it to drop prematurely. In short almost every kind of fruit-tree has its peculiar family of grubs, which, in their larva state, prey on the sap, the leaves, or the flower-buds; and it is to prevent this that my uncle is going to destroy them by that gas-wash.

Among various enemies of the apple-tree, he showed me in particular the apple aphid, or American blight, which was not known in this country till the year 1787. It is a very minute insect, covered with a long cotton-like wool; and fixes itself in the chinks and rough parts of the bark. It has spread throughout the kingdom, and about fifteen years ago destroyed such num-

bers of apple-trees in this country, that it was feared the making of cyder would be quite at an end, if some mode of banishing those insects was not discovered. Spirit of turpentine, or smearing the branches with oil, were found to be useful remedies : but Sir Joseph Banks has succeeded completely by the more simple process of taking off all the rugged old bark, and then scrubbing the trunk and branches with a hard brush. My uncle has found this insect infesting two of his apple-trees : so he will try each of those methods as a fair experiment.

21st.—Caroline and I took advantage of a walk with my uncle this morning, to remind him of his promise to teach us something of geology.

‘Are you prepared,’ said he, ‘to learn the general classification? Though uninteresting till you know more, it is the necessary foundation to any knowledge of that science.’

‘Oh yes, we are anxious to learn it, or any thing that you will be so good as to teach us.’

‘Very well,’ said my uncle ; ‘we will begin at once. In examining the surface of the earth, a person would at first imagine that the confused variety of mineral substances he saw was the result of mere chance ; but if in different places he should find the same substances constantly linked together—if, for instance, in traversing the different coal districts, he were to find sand,

clay, chalk, freestone, coal, limestone, sandstone, slate, and granite, succeed each other with tolerable uniformity, he would soon perceive that there was something like system in their arrangement. And on further examination, he would discover that this general *series* may be subdivided into several lesser series or *formations*, in which, also, considerable regularity may be observed. The order, then, in which these series are classed by geologists, is what I am now going to explain to my little girls.

‘ The first or upper series comprehends the mixed beds of sand, gravel, pebbles, and clay, which are frequently found covering the great chalk formation.

‘ The second class includes several different series more or less connected with each other: the most important of them are—1st, the chalk formation; 2ndly, a series of sands and clays beneath the chalk; 3rdly, a series of calcareous freestones, such as Portland and Bath stone; and, 4thly, beds of red marl and sandstone, sometimes containing alabaster and rock salt.

‘ The third general class comprises beds of coal and the limestones and sandstones on which they repose.

‘ The fourth or argillaceous class of rocks is characterised by their disposition to split into thin *laminæ*; such, for example, as the common roofing slate.

‘ The fifth, and lowest, contains all the varieties of granite and gneiss.

‘ These five series, or orders, have been named by one of our best geological writers, superior, super-medial, medial, submedial, and inferior. But the most general relation under which all these minerals present themselves, is that from which they have been named *primitive* and *secondary*. The primitive comprehend the lowest series of rocks, which serve as the basis upon which the others rest. They never contain any traces of former animals or vegetables, and may be supposed to have constituted the materials of the earth’s original surface.

‘ On the other hand, the different series which cover them sometimes contain the remains of vegetables and animals imbedded in them ; or sometimes they are made up of broken fragments of the primitive rocks, cemented together in a new form ; and these are therefore considered to be of a subsequent and secondary origin. Geologists, however, having observed that between the primitive rocks, and those which exhibit most distinctly the characters of the secondary class, there are others partaking of the nature of both, and containing comparatively but few organic remains, have distinguished them by the title of *transition rocks*. And the rocks which are above this transition series, they call *foetz* rocks ; a German term, implying their having been

deposited in horizontal beds, or *strata* ; while the strata of the older rocks were generally inclined at considerable angles. These floetz rocks were again subdivided into old floetz and new floetz ; and to the new floetz other writers have given the name *tertiary*.

‘ Though the distribution into the five series or orders, which I gave you, is, I think, the arrangement best suited to the science, yet it is necessary that you should recollect these other terms, because they are alluded to in almost every work to which you will have to refer. But I have given you quite enough for your first lesson.’

As soon as I came back from our walk, I wrote down all I could recollect of what my uncle had told us ; and I have transcribed it here, in hopes that it may interest dear Marianne : this, at all events, will fix it more firmly in my own head.

22nd.—My aunt has just had some small plants of the *rosa Grevillii* put in the stove. This rose tree grows in the most rapid manner out of doors, and is a great ornament to the conservatory, one end of which it covers entirely with its bunches of small white flowers tinged with pink. It produced some shoots last autumn, of nine or ten feet in length, which the gardener bent downwards, and laying them in the ground, he conducted them towards the adjoin-

ing wall, to which he nailed up the ends. They now look healthy and have fine swelling buds, as if they would soon be in a very flourishing state. He has found that the way to manage this rose is to plant it in a sandy loam, and to keep it very closely nailed to the wall, just like the Morella cherry.

I take great pleasure in watching the progress of the garden. The peach blossoms are really opening, and are lovely. The gardener has been very busy protecting them from the harsh winds, and from rain and hail, by woollen nettings stretched completely over them. But my uncle is always trying some pretty experiments; and one small tree is covered, or at least its blossoms are covered, by wool attached to the branches. Another is covered by small branches of birch, about two feet long, which were collected as soon as the leaves were full grown, in the end of June, and preserved under cover. There are studs in the wall, which project eight or ten inches, and to these the birchen branches are nailed with shreds. In order to try these experiments fairly, the trees which he has selected for them are on the same wall and in the same aspect.

We have been watching the tomtits, and find that they really do eat up the insects and larvæ that would be destructive to the blossoms; but I cannot say so much for the pretty, but mis-

chievous bulfinch, which too often amuses itself in picking off the flower-buds.

What endless entertainment, Mamma, there is in observing the operations of the birds! For some days we had heard a bird in the low wet grounds, for ever going on with two notes, like the whetting of a saw; and at last we traced it to a place by the river side, where there are some willow trees, and the remains of an orchard. We found it nestling in the decayed stems. Mary pronounced it to be the little black-capped marsh titmouse. We went two or three times to the old orchard, where we saw it very busy picking off little chips, in order to deepen a hole in a decayed willow tree for its nest; and I am told, that it makes the bottom much larger than the entrance.

The birds of passage which came here for winter are now all taking their departure; and others will, I suppose, soon replace them. Frederick often points out large flocks of them at a great height: but it is the charming singing birds that interest me: the blackbird, for instance, with his sweet whistle; and the thrush, who constantly varies his song. But still more, the missel thrush, the largest of the species, who, perched on a lofty tree, warbles a loud carol to the coming spring, with a very strong note. This bird is eleven inches long, and Frederick

showed me that it is distinguished by its having the three outer tail-feathers tipped with white. It goes as far north, he says, as Norway ; and is common in Russia. It is welcomed here as the harbinger of spring, and yet the country people call it the storm cock, because it is sometimes heard in stormy weather, drowning the voice of the other birds. It is particularly fond of building in old ash trees overgrown with lichens.

23rd.—Franklin is going to have several hives of bees, and is preparing an enclosure for them, in which there will be some of their favourite flowers ; it is placed near a rivulet, as they use a great deal of water. They are particularly fond of mignonette, thyme, mustard, when left to go to seed, turnips, white clover, and beans of all kinds. These are their principal favourites ; and it is said they afford the purest honey. Rosemary too is a favourite, but seldom produces much honey in this country, unless the season be warm and dry. It is worth cultivating, however, my aunt says, being one of the principal plants which gives the flavour to the famous Narbonne honey. She has had some planted in the warmest part of the bee enclosure, or Franklin's apiary, as Frederick calls it. There are several lime, poplar, and berberry trees, planted round it ; and a broom hedge is sown outside.

In a new swarm, their first care is to build

cells to serve as cradles; and very little honey is collected, until an ample store of *bee-bread* has been laid up for their food. This is composed of the pollen or dust of the anthers of flowers, which the *workers* are constantly employed in gathering. They fly from flower to flower, to collect it in the little baskets formed of hair, with which their hind legs are provided; and having deposited their booty in the hive, they return for a new load. This bee-bread, after it has been received into the bees' second stomach, is brought up again changed into a whitish jelly; and with that substance the young brood are diligently fed by other bees, till they change into *nymphs*.

Bees do not solely confine themselves to flowers; in collecting honey they are fond of the juices of fruits also, and for this reason my aunt recommended this bee enclosure to be placed very near the orchard which Franklin planted. With their tongue, which my aunt says is not a tube, as some people have supposed, but a real tongue, they lap or lick the honey, and convey it into the first stomach, which is called the honey-bag, and which, when full, is much swelled—it is never found in the second stomach. How the wax is secreted from the honey, or what vessels are employed for that purpose is not yet ascertained. But my aunt showed me the wax-pockets of the bee; by gently pressing the body, we could perceive on each of its four segments,

two whitish flaps, of a soft membranaceous texture, in which the wax is placed.

There is another substance made by the bees, and called *propolis* ; it is collected from poplar, birch, fir, and gummy trees like the taccamahaca. Bees have been observed to open the buds with their mandibles, so as to draw from them a thread of viscid matter ; and then with one of their second pair of legs, they take it from the mouth, and place it in the baskets on their hind legs. It is used in stopping every chink of the hive, by which cold, or wet, or insects, can enter ; it gives a finish to the combs, and the sticks which support these combs are covered with it, as well as the interior surface of the hive.

In collecting the pollen from plants, it has been observed, that bees never mix the farina of different flowers ; each is made use of in separate little pellets, and it is said that skilful botanists have been able to distinguish by the farina what flowers the bee had visited.

My aunt told me that she had read of a lady who had so constantly attended to her bees, and was so beloved by them, that they seemed to delight in flying round her and listening to her voice ; they had no sting for their kind mistress, and when, after a storm, she gathered them up, wiped, and tried to revive them by the warmth of her hand, they gently buzzed their gratitude as they recovered. When she visited the hive,

she caused no alarm ; and if, on seeing them less diligent than usual, or ill or languid, she poured a little wine at the outside of the hives, they always expressed their thanks in the same manner.

Franklin's new apiary, you see, has been of great benefit to me, for it led to a long conversation with my good aunt, who told me all those circumstances and many others in her usual clear way ; and when we came home, she put into my hands a little book called *Dialogues on Entomology*, in which she says, I shall find much useful information about bees and other insects.

24th.—At breakfast this morning my uncle received a letter from a brother of Colonel Travers, who you know is at Madras. It was written while he also was at breakfast, and Mr. T. mentions that there were then on the table eatables of different kinds, which had come from the four quarters of the globe.

This set us to consider from whence all the articles that were on our own table had been collected. Every one named something. The tea from China, the coffee from Arabia, West Indian sugar, Narbonne honey, the salt from Cheshire, and our home-made bread, butter, and cream. Then there were Coalbrook-dale cups and saucers, an urn from Birmingham, tea-pots and spoons of Mexican silver, a butter-vessel of

Bristol glass, knives of Swedish steel, and an Irish table-cloth and napkins.

Frederick proposed that we should calculate the number of people that must have been employed in producing all these various articles. He began with salt, as one of the simplest things on the table, and he easily ran through the operations of digging it out of the mine, making the little baskets in which it is sold, and conveying them by land or by water carriage to Gloucester; nor did he forget the wholesale and retail dealers, through whose hands they passed before they were deposited with my aunt's housekeeper. But my uncle reminded him that making fine salt was not only a far more complicated process than he seemed to imagine, but also that, unless he took into account the machines employed in every one of the operations, and even the tools requisite for making those machines, he would not be able to give a satisfactory answer to his own proposition. 'The same remark,' he continued, 'will apply to the production of everything else on the table: this roll, for instance, must not only include the labour of the baker, but that of the bolter, the miller, the reaper, the sower, and the ploughman, besides the manufacturers of all the implements they used. Or, take coffee, which, however simple the mere gathering of the berries and drying them in the sun may appear, can only be brought to this country through the complex

operations of commerce, and by means of a ship, which of itself includes the combined efforts of a hundred different trades before she can proceed a single mile on her voyage.'

'How rich, uncle,' said I, 'must any country become, where the people are employed both in agriculture and manufactures!'

'Yes,' he replied, 'as long as they are well paid, or, in other words, as long as there is a demand for as much as they can produce. But you know, Bertha, the inhabitants of any country can only consume a certain quantity of food, or a certain quantity of clothes; and if the hands employed raise more corn, or make more goods than are wanted, they must be thrown out of work until the overplus has been called for, as no one will pay for what they do not want. Something else, you see, is necessary to enrich a nation besides agriculture and manufactures.'

'Oh yes! I know what you mean, uncle, I am sure—commerce—by which that overplus is sent to other countries, and exchanged there for things which we do want.'

'You are right, Bertha. The agricultural and manufacturing classes may furnish each other with the necessities, and with many of the comforts of life; but, without the aid of commerce, they can never raise a nation to any great degree of wealth. Foreign commerce is the great spur to their industry; it opens a thousand channels

to their activity, and mutually enriches both themselves and the countries to which they trade. But it does much more—it brings distant nations into contact with each other—it makes up for the partial distribution of soil and climate—it may be said to equalize the bounties of Providence, and it is the grand means of spreading knowledge and civilization to the most remote corners of the world.'

25th.—In consequence of our breakfast conversation yesterday, on the productions of various countries, we invented a very amusing play in the evening, and I assure you that it was conducted with great precision.

Each person wrote on a bit of paper the name of some town, country, or province; these tickets were then shuffled together in a little basket, and whoever drew one out was obliged to give an account of some production, either natural or manufactured, for which that place was remarkable. This new-fashioned game was highly entertaining, for it brought out a number of curious bits of information which we had picked up, and which we might never have mentioned to each other, only from some such motive.

One of these was, that in Persia they have the art of carving spoons out of pear-wood, which are so delicate and so thin, that the bowl

of the spoon can be folded up like paper, and opened again. The handles, too, are so slender, that it is a particular accomplishment to carry them, when full, to the mouth in such a dexterous manner as to prevent their breaking. These delicate utensils are one of the accompaniments of men of rank, being only used by princes and noblemen when sipping their sherbet.

My aunt, having drawn Siberia, said she had a nice match for Frederick's wonderful spoons. In the province of Wiatka, bowls and cups are made of the knobs which grow on the birch-trees; they are yellow, marbled with brown veins, and, when varnished, are very pretty. But some of them are turned so extremely thin, as to be semi-transparent; and, when put into hot water, they become so pliant, that they may be spread out quite flat without injury, as they return to their original shape in drying.

The ticket for Constantinople was next drawn, and produced a description of the rose beads which are so much prized by the Sultan's wives, that they are usually called 'Beads of the Harem.' Those poor ladies have so little employment, that they sit for hours passing these beads, when strung, through their fingers. They are composed of the petals of the rose carefully picked, and pounded into a smooth paste in an iron vessel, which makes them quite black, on

the same principle, you know, Mamma, that ink is made by mixing a preparation of iron with *gallic acid*, of which the rose-petals contain a small quantity. When the paste is quite smooth, it is made up into little balls, which are perforated for stringing, and then slowly dried in the shade. When they have become hard, they are rubbed in the palms of the hands along with a little attar of rose, till quite smooth; and they always preserve their sweet smell.

Paraguay was on the next ticket, and Wentworth, who remembers all he reads, gave us a description of the famous tea of that country, large quantities of which are used in Chili and the states of Buenos Ayres. It is called *Maté*, and is made by boiling the leaves in an oval-shaped metal pot, about twice as large as an egg, on the hot embers, in a brasier, which stands, at all seasons of the year, in the middle of the room. When the water boils, a lump of burnt sugar is added, and the pot, being placed in a filagree silver stand, is handed round; each person drawing the *maté* into his mouth through a silver or glass tube, which is furnished, at the lower extremity, with a bulb, pierced with small holes. The natives drink it almost boiling-hot; and they have always some of this tea ready prepared, whether employed at home or in the fields. No one even departs on a journey without being provided with a quantity of the

dried herb, as well as with a maté-pot, which is either carried in the hand, or suspended round the neck by a small chain, if the person is on horseback. I was rather ashamed to confess that all these circumstances were new to me, as well as that the tree is a species of holly, the *Ilex Paraguayensis*; but you will tell me if they are correct.

Then came Kamtschatka, which produced an account of the *Sarana*, a species of lily that is universal in the eastern parts of Siberia, and almost covers the ground with its blossoms. The bulbs are gathered in August, and laid by for use; after being baked, they are reduced to flour, and are not only used in soups and other dishes, but make the best bread of the country. Sometimes they are boiled and eaten like potatoes; and, besides their own exertions in collecting them, the Kamtschatkans have a provident little mouse, which not only hoards them in its magazines, but has the sagacity to bring them out in sunny weather to dry. The natives search for and seize on these hoards, but they always leave some of the contents for their poor little purveyors. There are several species of this lily, from one of which the Russians produce a sort of wine.

We had afterwards the *Apatea* or Hottentot bread, made from a parasite which grows on the roots of a *Euphorbia*, at the Cape of Good

Hope, and which has neither stem nor leaf—only a flour that produces a large round and excellent fruit; but I really have not time to describe any more of these interesting little scraps, for my aunt says I must go out and walk.

26th, Sunday.—My uncle read to us, this morning, the history of Balaam's expedition with Balak, in order to curse Israel. This produced a long conversation; and I shall endeavour to give you an outline of what my uncle said.

‘ It appears from Scripture that there were two countries called Midian. That to which Moses had fled from the Egyptians was on the Red Sea; the other was on the River Arnon, near Moab; and as it was peopled by the descendants of Abraham and Keturah, we may suppose that the knowledge of the true God had been preserved there, though mixed with idolatrous corruptions. We know that in the days of Abraham, and long afterwards, there was a priesthood amongst the Canaanites, who preserved in great part the true worship.

In the age of Joseph, there was a priest of On, and in the time of Moses, Jethro, a priest of Midian, whose daughters they married; and it cannot be supposed that either Moses or Joseph would have been allowed to connect themselves with idolaters.

‘ It is not surprising, therefore, that Balaam should address the Lord as his God, though his worship was probably debased by superstition. It appears, indeed, from several concurring circumstances, that he was a real priest and prophet of the ancient patriarchal religion ; but he was the last ; for it had at that time become so corrupt, that it was necessary to separate the Israelites from the rest of the world, in order to preserve their religion.

‘ We have other instances to prove that this mixture of idolatry with the true worship did not hinder God from revealing himself to a few individuals who followed that mixed religion, as Abimelech, and also Nebuchadnezzar. Another proof that the patriarchal religion had not been sufficiently forgotten for its language to have become obsolete is, that Balaam’s expressions bear a strong resemblance to those used by the other prophets ; and that the epithets which he applies to the Supreme Being, are the same as those employed by Moses, Job, and other inspired writers.

‘ But Balaam, though a true priest and prophet, was unsound in heart, worldly, and mercenary. His selfish disposition and degenerate character were probably as well known to Balak as his high qualifications as a prophet were to the people ; and both well fitted him for a tool in the hands of that artful monarch. It was

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customary among the heathen, in those ages, at the beginning of a war, to devote their enemies to destruction with all the solemnities of religion ; and, terrified by the recent victories of the Israelites, lest they should ‘ lick up all, as the ox licketh up the grass,’ he applied to the venal prophet in his distress. He knew Balaam’s eminence in the church, and his influence over the people ; he knew that his interference might be purchased, and he bribed him to come and curse the invaders.

‘ Though Balaam was eager to obtain the proffered reward, and though he was flattered by the high opinion in which his blessings and curses were held, he well knew that they would be of no avail without the sanction of God. He, therefore, deferred giving any answer till he should have consulted the divine will ; and when that will was made known to him, he at once refused Balak’s request, alleging that God had said to him, “ Thou shalt not curse the people : for they are blessed.” This refers to the blessing given to Abraham, Genesis xii., and which was afterwards renewed to Jacob, Genesis xxvii. Balak, however, was not discouraged by the first refusal. He repeated his invitation, along with promises of an unlimited recompense ; and Balaam, having this time obtained the Divine permission, departed with the princes of Moab.’

‘ I asked my uncle, why he was now permitted to go, since his proposal to do so before had excited God’s displeasure ?

‘ God often graciously stays the wicked in their sins,’ said my uncle, ‘ or warns us when our inclinations are evil ; but if we obstinately persist in indulging them, he then leaves us to our own free will, and abandons us to our foolish imaginations. Balaam had set his heart on the promised honours and rewards, and was unwilling to forego them, notwithstanding God’s distinct prohibition ; so the foolish man was allowed to follow his inclination, to proceed in his own way, and to complete his own destruction. Just in the same manner, when the Israelites afterwards demanded a king to reign over them, God graciously condescended to expostulate with them, and to warn them of the consequences ; but they persisted—and, therefore, “ in his anger, he gave them a king.”

‘ But the fatal influence of covetousness and ambition, which made Balaam persist in desiring to go, soon led to his wishing to comply with Balak’s desire to curse Israel. That he went with this secret design, clearly appears from the angel’s saying, “ Thy way is perverse before me.” So you see that God’s anger was now kindled, not at his going, but because he went with a wicked intention. He was, however, suffered to proceed on his journey, in order to

convince the surrounding nations that Balak's cunning devices were useless in retarding the progress of the Israelites, or in defeating the purposes of the "Most High who ruleth in the kingdoms of men."

'Balaam was afterwards also very blameable in offering sacrifice on heathen altars, in the high places of Baal, which he must have been aware was strictly prohibited.'

My uncle promised to take up this interesting subject again next Sunday; but on our way to church he told me that these events happened in the year 1451 B.C., and about two centuries and a half before the Trojan war.

27th.—Frederick asked several questions, this morning, about the worship of Baal, on which he had been pondering since our conversation yesterday.

'Baal,' said my uncle, 'was the same as Bel or Belus. The name signifies Lord, and was originally applied to the Supreme Deity; but, in aftertimes, when idolatry became intermixed with the true religion, several of the heathen gods, and particularly the sun, were worshipped under that name. It was not only the general appellation of the sun throughout the east, but it extended from thence over great part of the western world; and many remnants of the worship of Baal, both names and customs,

are to be found at this day in the Hebrides and Western Highlands. *Baal-tine*, for instance, as Hertford mentioned in one of his letters, is an expression still in use—it means the fire of the sun ; and several other vestiges of solar worship may be also observed there. The name given in Scripture to the temples of Baal signifies those high places inclosed within walls, in which a perpetual fire was kept.'

Frederick asked why groves and high places were so positively forbidden in the Bible as places of worship ? To this my uncle replied, ' Because it was usual for those idolatrous nations to place their temples and altars in commanding situations, and to worship their false gods in the groves which were formed on those consecrated hills. Such places were well adapted to their mysterious rites, and the Israelites were enjoined to break their images, and cut down their groves ; and were further commanded never to plant a grove near an altar dedicated to Jehovah. Peor, to which Balak took Balaam, was the most famous high place in Moab ; and it was called Baalpeor, because there was a temple there dedicated to the worship of Baal.'

I asked my uncle why they selected hills for places of worship ?

' Some learned men,' said he, ' have fancied that it was in commemoration of the resting of the ark on the mountain of Ararat, where Noah

himself, immediately after the deluge, erected an altar, and offered burnt-offerings as testimonies of praise and gratitude. Thus, as every sanctified high place was supposed to represent Mount Ararat, so the sacred groves were symbols of Paradise; gloomy caves became the representatives of the floating ark of Noah; and even islands acquired a sacred character, because the top of Mount Ararat had once been surrounded by the sea.'

28th.—Caroline and I have had a delightful walk to-day with my uncle, to a wild rocky valley, where the hill on one side appears as if a part had been violently torn away, and shows several layers, or *strata*, of different substances, in the cliff. He pointed it out as a good example of stratification; and made us observe that the strata, though parallel to each other, were not parallel to the horizon, but more or less inclined to it. The angle of inclination between these strata and the horizon is called their *dip*.

'Now,' said my uncle, 'if the strata *dip* in one direction, they must *rise* in the opposite direction; and if they continue to rise, that is, if their course is not interrupted or bent down, they must gradually approach the surface, and, in some place or other, they must show themselves there. Look at that well-marked stratum of reddish stone in the opposite cliff; though it is

partially covered here and there by vegetation, yet you can easily trace it as it slopes upwards, till you see it actually arrive at the upper edge of the cliff. It is the same with all the strata which lie either above or below it: you see they rise successively towards the surface; and, if there be numerous other strata under the valley, and which, therefore, we cannot see, still they also will reach the surface further off. The place where any stratum makes its appearance on the surface is called its *out-crop*; and, as they range themselves there in regular succession, you must at once perceive that, in examining the surface, in a direction crossing the strata, you would find as complete a section of them as you now see in the face of the cliff, or as you could obtain by boring perpendicularly through them.'

He said a great deal more on this subject, and helped us to follow with our eyes several other strata to their out-crop. 'This circumstance,' he added, 'is of immense importance to the geologist; for, if the strata were all horizontal, we should be ignorant of everything below the mere external crust of the earth. Sometimes, indeed, a deep well, or the workings of a mine, might reveal the nature of the interior for a few hundreds of feet or yards; whereas, by examining the out-crop of the inclined strata, we can ascertain, not only their succession, but their composition, for many miles in thickness. Ano-

ther important consequence of this inclined distribution of the strata, is the variety of minerals which it enables mankind to obtain. If they were all horizontal, one country would be all marble, another all coal; but, by this beautiful irregularity of nature, everything that is useful approaches the surface somewhere or other, and puts itself within reach of the industry of man.'

'Are all the strata, then, sloped at this useful angle of which you speak?'

'Oh no, Bertha,' my uncle replied; 'they are inclined at every conceivable angle, from perfect horizontality in some places, to a vertical face in others.'

Caroline observed that even the strata at which we were looking did not all appear to have the same dip, and wondered what could be the cause of the difference. My uncle said she was quite right in the fact; the strata at the eastern end of the valley had evidently a more sudden dip than the rest. 'But,' he continued, 'it is to facts, my little geologists, that we must at first confine ourselves: though causes and theories are highly interesting, at present they would only bewilder you. Those numerous strata, however, will afford some illustration of what I told you a few days ago about *formations*. You see, by the frequent repetitions of the same substances in the cliff, that the same strata are frequently repeated, and in the same

order. When this order is once known, the geologist is no longer perplexed by the number of strata ; each throws light upon the other, and the whole combination receives the name of a *series*, or *formation*. By comparing several of these series together, a resemblance in relation and position will be observed between many of them, which will lead to a still greater simplification of the different classes.'

My uncle then changed the conversation : we begged of him to go on with his geology, but we could not persuade him. He said if we attempted to remember too much, we should lose the whole. ' Will you, then, give us a little lecture on it every day ? '

' I will, with great pleasure, occasionally converse on the subject with both of you, my dear children,' said he ; ' and, in our walks, or whenever a proper opportunity occurs, I will endeavour to give you a few general ideas of the structure of the globe. Hereafter we may, perhaps, enter more minutely into the details of the science, and then it will be time enough to talk of daily lectures.'

March 1st.— My dear Mamma has often laughed at me for my love of little coincidences ; and I have now a new one to tell her. I very lately mentioned in my journal some remarks, made by Dr. Walker, of Edinburgh, on the sea-

sons of the flowering of foreign plants ; and, this morning, my uncle happened to see in the newspaper the following extract from an address to the Agricultural Society of St. Helena, by General Walker, who is the son of that ingenious doctor. My uncle desired me to read it, and said that these speculations are very useful to inquiring minds ; they furnish hints, and they naturally lead to new experiments, which elicit new facts.

‘ The functions of plants, as well as animals, depend on the air in which they live. I have observed that those of St. Helena which have been brought from another hemisphere, are very irregular in their annual progress ; many of them, in the development of their foliage, have adopted the law of nature peculiar to the country into which they have been transplanted—others, more obstinate, remain faithful to their former habits, and continue to follow the stated changes to which they had been accustomed. They all appear to maintain a struggle, either before they adopt the habits which belong to the seasons of their new country, or decide on retaining their relations with the old. In yielding to external circumstances, they appear to have different tempers.

‘ This is often observed in plants of the same species appearing to hesitate before they adopt the mode of performing their functions. And, when their decision is made, we are at a loss to

discover an adequate cause. For instance, an oak raised from English seed, loses its leaves in a St. Helena winter of 68° ; yet it experiences nothing like the difference of temperature which, by analogy, might be supposed to cause that change.

‘It would add to the natural history of vegetation, and improve our knowledge of the geography of plants, were the facts concerning their habits and changes, under different temperatures, carefully collected.’

2nd.—Miss Perceval, with whom I recollect you used to wish me to be acquainted, has come to spend a few weeks here; and I shall now not only have the pleasure of knowing a person you like, but of taking many a botanising walk with her as the Spring advances. She seems very gentle, and so unwilling to put herself forward, that my uncle is obliged to reproach her for withholding the stores of knowledge which she possesses; and he generally leads the conversation to such subjects as will make her display them a little, in spite of her diffidence.

She disclaims all over-modesty, but says that such has been the progress of knowledge within the last ten years, and so greatly has it become diffused through all classes, and particularly amongst females, that she feels that almost everybody knows as much as she does; besides, she

added, 'I have lived so completely out of the world of late, that I have really much more to learn than to teach.'

She speaks of you, dear Mamma, as of an old and valued friend; and I think she will be kind to me for your sake.

4th.—Miss Perceval has been so much interested by a letter which my aunt received yesterday from her friend in Upper Canada, that she petitioned for some of her former letters; and my aunt has permitted me also to see them and to make some extracts for you, dear Mamma.

During their progress in open boats up the St. Lawrence, Mrs. * * * soon began to feel the hardships of a Canada life; she and her family generally preferred sleeping on fresh hay, the beds at the inns were so full of vermin. Sometimes they even slept on the ground, sheltered from the night air only by an awning;—and more than once in their open boat under a heavy dew. She speaks of the farmers with great gratitude; whenever she stopped at their houses she was received with the kindest hospitality, and her children plentifully supplied with milk and good bread. Throughout her journal, which I wish you could read, and in all her letters, there is the most amiable disposition to make the best of everything, and to enjoy whatever little comfort she could find in her situation,

without looking back on her former very different life. In October they settled at the town of Cobourg, near Lake Ontario, as a temporary residence while a house was building for them on the land they had obtained. She describes her house thus :—

' Cobourg, Oct. 30.

‘ There are three rooms on the ground floor, and four above, but they are so small they are like little closets ; we contrive, however, to squeeze into them, and though we shall be here two months, we can easily reconcile ourselves to these little inconveniences.

‘ There is a nice grassy place in front of the house, it is paled in, and the children can play in it with safety : that is one great comfort. We found some boards in the barn, and Mr. * * *, whose old tastes as an amateur mechanic are now very useful, has made temporary shelves and tables of them. We have at present neither table, chair, nor bedstead, the carriage of these articles was too expensive for us ; but we have screws and all things ready, to make them when we are settled in our loghouse, for which I long as ardently as if it was a palace.

‘ Our bed-rooms have no doors, but we hang up blankets, which answer the purpose. Fortunately we have plenty of these, and the air is so dry that we do not suffer from the cold, though the nights are frosty, and not a fire-place in the

house, except that in the kitchen. The frost has given the woods a grey look, instead of the beautiful orange autumnal tints they had before.

‘ Four years ago, there were but two houses here ; now it is a nice thriving town, with a neat church, a large school-house, and some very good shops, or *stores*, as they are called ; and the houses are in general very neat.

‘ We have been visited by several respectable families. There is a gentleman here who was for twenty-five years engaged in the North-west or fur-trade, and during that time he never once returned to his family. He had left home at the age of thirteen, and underwent all kinds of adventures and hardships. One winter, when their provisions fell short, he and his companions were obliged to eat their leather aprons, and even the leather of their shoes ! ’

‘ *Cobourg, Jan. 1st.*—We have been detained here longer than we intended ; first by the illness of my eldest girl, and next, waiting for snow to make the roads fit for travelling ; at present they are in such a state of roughness, from the hard frost after the heavy rains of last month, that the jolting of either cart or waggon could not be borne. There are no covered carriages here. In winter, *sleighs* (sledges) are used, or waggons, which are neither very nice nor easy. They are very roughly made, with two seats placed across, one before the other, and

have rather an odd appearance for gentlemen's carriages.

'This new year's day, I hope you are all as well and happy as I am; and I am sure it will give you pleasure to know, my beloved friends, that we could indulge ourselves by going to church on Christmas-day, and receiving the sacrament. Do not imagine that in this banishment, as I fear you still consider it, these duties are neglected; far from it; we have a church near us, and, I thank God, the inclination to make use of it.'

5th, Sunday.—The subject of Balaam was continued this morning; and I took an opportunity of asking the meaning of the word *parable*, as it is used in Numbers xxiii. 7.

'It has more significations than one,' said my uncle, 'in both the Old and the New Testaments. It sometimes implies that sort of address to the people, which, from its tone of authority as well as from its elevated language, seems to have been the effect of inspiration. Thus Balaam is said to have taken up his parable, when, contrary to his own wishes and in a style approaching to poetry, he uttered his sublime prophecies. The Psalmist also, after saying, "I will open my mouth in a parable," gives a rapid, but magnificent sketch of the wonders that God performed for the children of Israel. Secondly, we find it

applied in the Greek Septuagint (1 Kings iv. 32) to those short sententious sayings of Solomon, which in the English version are called proverbs. And in Ecclesiasticus, our translators have rendered the same Hebrew word in some places by "parables," and in others by "wise sentences." Thirdly, in the Gospel it is used in the sense of an apologue or fable; a mode of conveying instruction, or of explaining certain doctrines, which our Lord thought proper to adopt; and which had been frequently employed by the Prophets in the Old Testament.

'It was in the first of these three senses,' continued my uncle, 'that Balaam appears to have taken up his parable. Having stated why he had come to Moab, and having confessed that he could not curse those whom God had not cursed, he immediately prophesies the increase and power of Israel. "Lo, this people shall dwell alone, and shall not be reckoned among the nations." Had he not been inspired, how could he, on a distant view of a people he had never seen before, have discovered the peculiarities which distinguished the Israelites and their posterity to the latest ages? Their religion and government were then unknown; yet he foretold their entire separation from all other nations; and the present state of the Jews, and all history, confirm the truth of his prediction.'

I asked my uncle why Balak desired the

prophet to go with him to *another* place to curse them ?

My uncle said, 'that it was the opinion of the heathens, that if one victim failed, or if the Deity was unpropitious at one place, he should be importuned by a repetition of the sacrifice elsewhere. Balaam, therefore, to gratify the king, repeated the same experiment a second and a third time ; but still with the same disappointment.'

Caroline made some remark on these words, 'He hath as it were the strength of the Unicorn?' and my uncle said, 'It is not known with certainty to what animal the strength of Israel is here compared ; some have supposed the unicorn to be a kind of single-horned antelope, others think that it is the rhinoceros ; but if any of you will remind me of the subject some other day, we will endeavour to see which is the best founded opinion. Balaam afterwards compares the power of Israel to that of the lion ; and both seem to allude to the victories by which the Israelites should gain possession of the land of Canaan. It is remarkable, that the inspired language of Balaam very much resembles that which Jacob had used in his predictions respecting Judah. Such is the harmony and connexion between the prophecies of Scripture.'

6th.—We were resolved not to defer the sub-

ject of the unicorn ; and this morning we began by searching for as much light on the subject as our books could give us, that we might be the better qualified to discuss it with my uncle.

I found in Perceval's *Cape of Good Hope*, that notwithstanding all the assertions he had heard of the existence of this animal in Southern Africa, he never met any person who had seen one. A horn, nearly three feet long, was indeed shown him, as being that of the unicorn, but it evidently belonged to a large species of antelope. My uncle afterwards told us, that there is an antelope of this kind in the mountains of India, which the natives used to pretend had only a single horn ; but since the conquest of Nepaul, those mountains have been visited by English officers, who have seen the animal alive with both its horns.

Frederick produced Mr. Barrow's description of a drawing he had seen at the Cape, representing a single horn projecting from the forehead of an animal, which, he says, resembles a horse, with an elegantly shaped body, marked, from the shoulders to the flanks, with longitudinal stripes or bands.

Mary had collected a great many facts about the rhinoceros ; and she made it appear pretty clearly, that the allusion in Scripture to the strength and untameableness of the unicorn, are much more applicable to the rhinoceros than to

any species of antelope, all of which are remarkably deficient in strength, and naturally timid. She found in some book that the derivation of the Scripture name *Reem*, both in the Hebrew and the Ethiopic, implies erectness; and though the rhinoceros is by no means a very erect animal, yet his horn certainly is so, as it stands perpendicular to the face; and in that respect, it differs from the horns of all other animals. 'The upright direction of the horn,' Mary said, 'as well as the power and fierceness of the rhinoceros, would equally justify the metaphor in the Psalms, "my horn shalt thou exalt like the horn of a unicorn."' '

Caroline then brought forward her authorities to prove, that in Abyssinia, the name of the rhinoceros signifies the beast with *the horn*, implying that it has but one; whereas, in Nubia, the name expresses *horn upon horn*. But as the Septuagint translates the word *reem* into *monoceros*, or unicorn, we may suppose that if the rhinoceros had always two horns, the writers of the Septuagint, who probably must have seen the animal at Alexandria, at the exhibition given by Ptolemy Philadelphus, would not have called it *monoceros*.

We proceeded with our gleanings to my uncle, who seemed pleased with our industry. He observed, that notwithstanding the translation in the Septuagint, it was not quite certain that the

reem or unicorn of the Hebrew Scriptures was always mentioned there as having but one horn ; and he pointed out a passage in Deuteronomy, where horns in the plural are distinctly expressed. ' But,' said my uncle, ' it is classed with the behemoth and leviathan, which are supposed to be the elephant and crocodile, and the savage rhinoceros seems to be a more suitable companion to those huge and terrific creatures than the delicate antelope. Every body knows that there are two species of that animal, the *R. unicornis*, and the *R. bicornis* ; and that the latter is only found in certain parts of Africa. The former, or one-horned species, is common not only in Abyssinia, but all over Asia, and in Arabia is called by the name of *reem*, to the present day. Why then should we doubt that this untamed and destructive animal, which, in every respect, answers to the description in Scripture, should be the unicorn mentioned there ; and having a horn, or horns, according to the different countries where the allusion was made ?'

My uncle then showed us Sparman's account of the two-horned rhinoceros which he killed and dissected at the Cape. The longest horn, which is close to the nose, measured about eighteen inches in length, and seven in diameter. The uppermost horn was much smaller, and much worn, and the Hottentots told the Doctor, that these animals had the power of turning the

long horn aside out of the way, while they employed the other in rooting up the plants on which they feed. But my uncle does not believe that there is any truth in this assertion.

7th.—I have just had a little geological lecture, and hasten to write the substance while it is fresh in my memory.

In examining the materials of which our great mineral masses are composed, we are immediately struck by the difference of the *older formations*, which proceeded from causes that have long ceased to operate, and those *newer formations*, the causes of which are still at work under our own observation.

Compared with the former, these recent formations are of very limited extent; they consist of the sand and stones that are accumulated on the sea coast by tides and currents; of the land washed away from one bank of a river, and thrown up on the opposite bank by the winding stream; of the earth and gravel, and fragments of rock, carried down by all rivers, and forming deposits at their mouths; and of the constant increase of marsh land, in consequence of the growth of aquatic plants. All these appear to have proceeded uninterruptedly from the period when our continents assumed their present form, and may be all designated by the general term *alluvial*. There are vast alluvial formations at

the mouths of the Ganges, the Nile, the Mississippi, the Amazons, and other great rivers; and an evident change has been effected by these means in many sea-coast countries, of which there are innumerable instances.

The overflowing of the Rhine, the Arno, and the Po, formerly dispersed the soil they carried down over the neighbouring land; but ever since it has been confined within dykes, their deposits have not only elevated the beds of these rivers, but are also rapidly pushing forward their mouths into the sea. The low alluvial plains through which they run were themselves produced by ancient deposits; and the progress of this continually increasing formation may be easily estimated from various historic records. From Strabo we learn that Ravenna was situated, in the time of Augustus, at the head of a bay connected with the Adriatic, and that it had then a good harbour; yet it is now three miles from the coast. By comparing the old maps with the present state of the Duchy of Ferrara, which is flooded annually by the Po, it appears that the coast has gained from the sea 14,000 yards in breadth since the year 1604, giving an average of sixty yards for its advance per annum. And the town of Adria, which in ancient times was a sea-port, is now sixteen miles inland!

The same causes have produced similar effects along the branches of the Rhine and Maëse;

and for many leagues from their mouths the country exhibits the singular spectacle of having its largest rivers held up by dykes at the height of twenty or thirty feet above the level of the land. The alluvial depositions on the north coasts of Friesland and Groningen, and the increase of land which they have effected, are very considerable; the first dykes were formed in 1570; and in only one hundred years afterwards, the deposits had accumulated to the extent of nearly three miles on the outside of the dykes. A large part of the United Provinces has thus been actually formed by materials washed down from the interior of Germany; and many populous cities now stand where the sea once rolled its waves.

8th.—Of the various buds which are beginning to open, none advance so rapidly as those of the peach blossoms. On the 14th of February I first observed a little streak of red at the tops of a few; they are now quite opened, and looked very pretty last week, when the ground was slightly covered with snow.

I must tell you a curious thing about buds. Early in January we had some little branches and twigs of several trees brought in, that we might see the state of the buds; and I put a few into a jug of water in my room, that I might examine them at leisure. Very soon after-

wards, I perceived that the buds were beginning to swell; their scales gradually separated, and now there are some horse-chesnut leaves quite opened out, and displaying the beautiful manner in which they, and the embryo flower, were folded up and preserved within those scaly cases in the winter. I thought it very extraordinary that they should have been supported merely by water; but my uncle says that the principal nourishment of all plants is derived from water. The famous botanist, Du Hamel, reared an oak tree for eight years in water only; and a willow planted by Van Helmont in a pot, increased fifty pounds in weight in five years, though the earth, which had been accurately weighed, was only diminished by two ounces.

In my collection of branches there were some of lilac and of pear; and on each of these, the buds, which were hard, little greenish knobs when first put in the water, have now burst open and disclosed their cluster of miniature flower-buds.

We have all been employed in dissecting and examining leaf-buds of various trees: for my own part, I think that I can distinctly see in most of them that they proceed from the wood; and in some I could plainly trace the little communication that connects the wood and the bud. But my uncle says we must continue to study this subject for years before we can venture to form a decided opinion.

I intend to keep my branches in water as long as possible, that I may see what happens at last. On the living trees out of doors, no leaf-bud has yet attempted to unfold its scales.

9th.—As we walked in the sheltered kitchen-garden this stormy day, Miss Perceval remarked what an alteration soil, climate, and culture can produce in the external characters of plants; and for remarkable instances of this, she says, we need not go farther than the kitchen-garden.

‘There,’ she said, ‘we find cabbage, cauliflower, kale, brocoli, and turnip-rooted cabbage; but who could ever imagine that all these were from the same original species? Nothing, however, is more certain than that they are all varieties produced by the cultivation of a plant which grows wild on the sea-shores of Europe, and which, in its external appearance, is as different from any of those, as they are from each other. These alterations become so strongly fixed by habit, that they continue in the plants that spring from the seeds of each variety; they are liable, however, again to degenerate into each other; and it is only by the art of gardening that they are preserved distinct, or that fresh varieties are produced.’

Miss Perceval made me examine the several young crops of cabbage of different kinds, which

had been sown at short intervals during February and the beginning of March, that they might be ready for use in succession ; and I find that, although she is such a great botanist, she does not at all despise the knowledge of garden vegetables and of their cultivation. Indeed, she says that it is being but half a botanist, not to have a general knowledge of all the useful vegetables, with the principles of their cultivation, and their times and seasons.

Among the few plots of cabbage now in leaf, we found some rows of the large-ribbed species, in which there appeared to be several varieties ; and in trying to make out the differences, I perceived an odd tail or appendage to some of the leaves. When I made Miss P. take notice of it, she was surprised, and said she had never before observed a similar circumstance in the growth of any cabbages. This curious appendage, which grows from the back of the principal rib, in its substance is like the footstalk of the leaves ; and at the end it dilates into a sort of hollow cup like a funnel, with something of the appearance of the *nepenthes*, or pitcher plant.

11th.—I asked my uncle, after dinner, what were those older causes, which he told us had produced such infinitely greater changes in the

structure of the earth's surface than any that are now going on.

‘The more you learn,’ he replied, ‘of the structure of the earth, and of the prodigious thickness of the strata, which once must have lain horizontally, and which have been since torn up and thrown into every angle of inclination, the more readily you will form an idea of the stupendous power with which that cause must have operated. The changes which are now in constant progress are very limited in their effects, and are entirely confined to the surface. The action of frost in crumbling the rocky tops of the mountains, and of rivers in carrying the fragments to the sea, and thus altering the outline of the coasts, I have already mentioned. Considerable changes are also produced by avalanches, by inundations, and by the unceasing action of the waves of the sea. But these changes are slow, and can never be very extensive. The effect of volcanoes is greater; and though many countries bear the traces of having been overflowed by vast torrents of lava, they are now confined to a comparatively small portion of the globe. But if they were far more numerous or extensive, volcanoes could not have raised up or overthrown the strata through which their apertures pass, still less could they have acted upon those immense regions which are not

volcanic. The mind, indeed, is lost in astonishment at the means employed by nature in feeding these enormous fires from such prodigious depths ; but still we must perceive how inadequate they are to account for the revolutions which appear to have shaken the earth to its foundations. The same reasoning applies to earthquakes ; their consequences are awfully great in the adjacent country, but very far from being equal to explain the subversions which appear to have occurred in every corner of the world that has been visited.

‘ In short, all the greatest possible efforts of those causes that can be supposed to have taken place since the creation, cannot have inverted the strata, nor inclosed great quadrupeds in solid stone, nor imbedded bones, shells, and vegetables in the middle of compact rocks, nor have deposited complete strata of shell-fish at the tops of the highest mountains ; nor could they have swept away whole species of animals which once inhabited the earth ; causes, which evidently extend through a limited space, and whose effects are only partial, could never have operated throughout the globe, to produce the general and amazing changes that we observe in all parts of it. To produce such a universal effect, the cause must have been not only powerful, but general.

‘ Sacred history alone furnishes us with the

knowledge of this general and powerful cause—the Deluge. What physical means Providence employed to produce this great convulsion, have not been revealed to us, but that the whole globe must have been involved in its fury is everywhere apparent. The former bed of the ocean must have been lifted up; former continents must have been sunk; and the entire crust of the earth must have been rent, shattered, and tossed into every variety of position.'

12th, *Sunday*.—'And Balaam rose up, and went and returned to his place.'

'The place alluded to here,' said my uncle, 'was his own country, Mesopotamia. His prophecies having been delivered, the design of Heaven was answered, and the instrument was thrown aside. The wicked Balaam was now left to pursue the schemes of his ambition; and they were intended to be as destructive to the Israelites as if he had even succeeded in cursing them. Josephus tells us, that Balaam informed the king that he could never subdue the Israelites, unless they should be disobedient to their God; and he instructed him how to make them so. This seems to be confirmed in Sacred History by Moses, who says that Balaam "caused the Israelites to commit trespass against the Lord," and also by St. John, in the second chapter of Revelations. The consequence was a severe

plague, which was inflicted on them as a punishment, and which swept off many thousand people.

'The history of this obdurate Prophet furnishes a deplorable instance of the weakness of the human heart, and of the obstinacy with which it clings to sinful passions, in spite of the most solemn warnings. Balaam could not forego the tempting offer of Balak, nor the allurements of his own ambition; after having been refused permission to go to that king, and after having been obliged to bless the people instead of cursing them, he endeavoured, by his mischievous counsel, to seduce the Israelites into idolatry. He expressed, indeed, a hope of dying the death of the righteous, but for that purpose he should have lived the life of the righteous. He was cut off by the avenging sword; and his end furnishes an awful example of the gradual progress of sin, and proves that extraordinary "gifts of the Spirit" are not always accompanied by the genuine "fruits of the Spirit." When we possess extraordinary talents, or any peculiar gifts from Providence, we should consider them as so many temptations or trials, and pray the more humbly and strenuously for assistance to use them virtuously.'

My uncle then explained that to tempt, is an old English word, which signifies to try; it is frequently so used in all our old works, as well

as in the Bible. The forty years' temptation in the wilderness evidently means trial. Forty years long did I tempt and prove thee—that is, did I try thee. Again, in the text, 'to take him a nation from amidst another nation, by temptations, by signs, and by wonders,' Deut. iv. 34. The word 'temptations' is undoubtedly put for trials; for the miracles wrought in Egypt were real trials both to the Egyptians and to the Israelites, who were thereby given the alternative of obedience, or of obstinate resistance. And St. Paul repeatedly tells us, that even good men are allowed to fall into *trying* circumstances, for the exercise and improvement of their virtue.

13th.—My aunt has been showing me various species of the aphis to-day.

There are two distinct sorts which belong to the plum tree, one of a yellowish green, with a round short body; the other oblong, of a bluish green, enamelled with white. The same kinds are found on the gooseberry and currant; and the rose tree supports three distinct species.

There are some amusing circumstances told of the singular friendship that appears to subsist between these little animals and ants, with whom they share the honey they obtain, and are in return assisted and protected. I met this morning with an entertaining account of these

facts in the Dialogues on Entomology, which my aunt lent me last month.

There is another species called the oak puceron, which bury themselves in the crevices of the bark when it is a little separated from the wood, and live at their ease on the sap. They are black, and nearly as large as a common house-fly. Their trunk is twice the length of their bodies, and it holds so fast by the wood, that, when pulled away, it frequently brings a small piece along with it. Ants are so fond of this species of puceron, that they are the surest guides where to find it; for whenever we see a number of ants upon an oak, and all creeping into one cleft of the bark, we may be certain, my aunt says, of finding quantities of oak pucerons there.

Mary, two or three days ago, raised the turf in different places, in a dry pasture field, and shewed me clusters of ants gathered about some large grey pucerons. My aunt says that these earth pucerons draw the juices from the roots of plants, as the other species do from the stem and branches. It is imagined by some people, that they are only the common pucerons, which, in winter, creep into the earth to shelter themselves: but this is not the case, as they are usually met with in places distant from the trees or plants on which they might before have fed. And she says, that though many may be killed by the

cold, yet numbers escape, and are found early in spring, sucking the buds of the peach and other trees.

14th.—I have not yet found the least difficulty in comprehending what my uncle tells us in our geological conversations. This is partly owing to the clearness with which he teaches; and partly to my immediately writing down the substance of it for you. The habit of writing this journal has been indeed of very great use to me, and I have to thank you, dear Mamma, for desiring me to do it. I am afraid Marianne will not be much interested as yet by the present subject, for want of my uncle's explanations; but when I am once more with you and her, I will try to give her at full length the details of what he has told us; and I am sure that she will then like it for his sake.

We have just had another little chapter on the changes in the globe. My uncle said, that extraordinary as the changes on its surface appear, yet when we have an opportunity of penetrating a little into the interior by means of deep mines, or of viewing a long section of the strata in cliffs or on bare mountains, then our ideas expand into a clearer conception of the extent and grandeur of its ancient revolutions. In examining the more elevated chains of mountains, or in following the beds of their torrents, we can

perceive somewhat of its interior structure thus laid open to us.

The low and level parts of the earth, when penetrated to a great depth, generally exhibit parallel strata, composed of various substances, and most of them containing vegetable and animal, and innumerable marine productions. Similar strata, with the same kind of productions, compose the hills even to a great height; and sometimes the shells are so numerous, that an entire stratum seems to be formed of them. These shells are frequently in such perfect preservation, that they retain their sharpest ridges, and their tenderest forms. They are sometimes found incrustated in hard stone, and sometimes inclosed in loose sand or clay; and the nicest comparison cannot detect any difference between the texture of these shells, and those which now inhabit the sea. It is, therefore, fair to conclude, that they also must have formerly lived in the sea, and, consequently, that the sea must once have flowed over those places.

But we must not forget that in some countries none of these remains occur, for instance, in Cornwall, and the highlands of Scotland; while in others, not a well can be sunk, or a pit opened, without presenting them in abundance; as in the south-eastern counties of England. The reason of this difference will, I am sure, have suggested itself, if you recollect our former conversations;

Cornwall is composed of the lowest series of rocks, which are therefore called primitive; and they, you know, must be entirely destitute of organic remains. The next series contains them very sparingly, but they abound in the three succeeding series, or what are called the *secondary formations*; though sometimes there are beds interposed, in which they are still rare. In examining these organic remains, the skill of the botanist and zoologist has discovered that several of the plants and animals are entirely different from any with which we are at present acquainted; and a vast field of inquiry has thus been opened in those departments of nature.

I asked my uncle whether these remains are regularly distributed through the whole of those series in which they are so numerous. He likes that I should ask him questions; he says it doubles his pleasure in giving information, when he sees people really alive to what he tells them.

He replied, that, in one respect, the regularity is surprising, for they are found, as it were, in families; each formation containing a collection of species often peculiar to itself, and differing widely from those of the adjoining one; so that at any two points, in similar formations, however distant, we are sure of meeting the same general assemblage of fossil remains. For instance, if the fossils found in the chalk of Flamborough Head in Yorkshire, or in the cliffs of Dover, or

even in Poland, or Paris, be examined, eight or nine species out of ten will be found to be the same. Again, if collections of fossils from the *carboniferous* limestone, of any of the above places, are compared, they will be found to agree in the same manner with each other : but if you compare the collection from the chalk, with that from the limestone, you would not find one single instance of agreement ; indeed very few appearances of it that could deceive even your unpractised eye.

‘ I wish, uncle, I could make these curious comparisons with my own eyes.’

‘ So you shall, my dear Bertha. I have a few specimens of remarkable fossils, though I have no regular collection ; and when we reach home, I will endeavour to shew you some instances of these facts, as they interest you and Caroline so much,’

15th.—I have made another extract from the Canada letters for my dear Mamma.

‘ *Loghouse, February 24th.* ’

‘ Here we are at last ; and though we must bear a good deal of inconvenience for some time, yet we feel all the enjoyment of being really *at home*.

‘ On Monday morning, Feb. 10, we left Coubourg. Mr. **** and I on one seat, with a little girl between us ; the maid and the other

two children on the seat before us, and our charioteer in front. We had blankets and cloaks to roll about our feet, and a basket of cold meat and bread. Another sleigh carried our bedding, trunks, and luggage, besides baskets of poultry and our two dogs.

‘ We travelled twenty miles that day very pleasantly ; passing through miles and miles of forest. I was delighted with this new scene. Every now and then, we came to small *clearings*, with loghouses, and generally with a good stock of cattle and poultry.

‘ At four o'clock we reached the inn ; and we passed the night there very comfortably, sleeping on the floor in the sitting-room, where we spread our mattresses and blankets.

‘ Next day, our road lay through thick woods ; indeed, it scarcely deserved that name, for it was merely a track through the snow where other sleighs had lately passed. We turned backwards and forwards through the crowded trees, and often had showers of snow from branches which our heads touched : the boughs of the beautiful hemlock-pine were so loaded with it, and bent down so low, that we were obliged to lie down to pass under them ; and twice we were obliged to stop and cut a passage where trees had fallen across the way. We drove for nine miles through woods without seeing any habitation, except two Indian huts.

‘ When we arrived at the banks of the river, near the mills we found that the ice had given way, so that the sleighs could not cross ; and the miller’s boat could not ply, because there was still a broad border of ice on each side of the river. We sent a man across to beg of our friend, Mr. —, who was settled there, to send his oxen and sleigh to a part of the river called the Little Lake, two miles lower down ; and we determined to walk across. This delay was very embarrassing, but our travels were nearly at an end, and that gave us spirits to proceed with vigour through the snow, which came far above our ancles. The friends who came from the opposite side to meet us, carried the two youngest children ; the workmen carried our bedding, and everything else was left at the mills. With this assistance we contrived to cross ; and being soon packed into the sleigh, we proceeded, in the shades of evening, to our home, through nearly five miles of wood. Our loghouse was quite illuminated by the glare of the fires which had been prepared for us, and even if there had been no fire, we must have been warmed by the joy our friend shewed at seeing us here.

‘ The house was not quite finished, and we found it rather cold at night ; but every day since, we have made it more and more comfortable. Our books fill up one side of the parlour, and give it a comfortable look ; and as it has

two windows, one to the south, and one to the west, we have now the delightful warm sun shining in from ten till past five.

‘This is really a pretty spot—even now, though the ground is covered with snow. The river is broad, and rushes by with great noise and rapidity, carrying down lumps of ice from the lake; it winds beautifully, and the banks are fringed with fine-spreading cedars and lofty hemlock-pines.

‘We have been most prosperous in everything—voyage, journey, and health; and when I look back and think of all we have gone through since you and I parted, I cannot help feeling surprise, mixed with gratitude, to that merciful Being, who has watched over us and protected us all.’

16th.—I was talking to Mary after dinner, about the ant and the little puceron, and praising their mutual good feeling; but she said there were very few instances of such friendship among insects, and a great many of their hostility to each other. She mentioned the following fact, which will, I think, amuse Marianne.

The *perce-bois*, or wood-boring bee, an inhabitant of warm countries, and distinguished by her beautiful violet wings, is remarkable for boring long cylindrical cells in decayed trees, or even in window-frames. She first bores obliquely

into the wood with her strong mandibles, and then follows the direction of the fibres, forming a hole or tunnel of more than a foot in length, and half an inch in diameter. At the inner end of this pipe she deposits an egg, along with a sufficient store of honey and farina, for the support of her future offspring; and covering it with a thin partition, made of the particles of wood she had scooped out and cemented together with wax, she proceeds to deposit another egg and another supply of provision; and so on till the whole pipe is full. I must also tell you, that from the innermost cell she had previously bored a small channel to the outside of the wood, as a kind of back door, by which the young produced from the first-laid eggs should escape in succession, each of them instinctively piercing the partition in the right direction. But now, Mamma, for my fact: there is a small species of beetle that watches the operations of the bee, and slyly deposits its egg also in the cell. If this egg should escape the vigilance of the poor bee, it is hatched into a larva before her own eggs, and, consuming all the food she had so industriously prepared, the right owner of the dwelling perishes.

The wood-boring bee reminded my uncle of the *teredo* or ship-worm, which destroys the planks on ships' bottoms, by piercing them in all directions; and he told us that the ingenious Mr.

Brunel had himself stated to a friend of his, that it was from the operations of this worm that he had borrowed the method which has been adopted in forming the tunnel under the Thames.

Mr. Brunel observed that the teredo's head is covered with a strong armour, through a little hole in which it perforates the wood first in one direction and then in another, till the arched way is complete; when it daubs both roof and sides with a kind of varnish. In like manner Mr. B. conducts his operations in the tunnel; removing the ground in front, through the small apertures of a strong iron frame, which he calls the *shield*, in imitation of the teredo's armour; and then constructing a circular arch of brick-work, with strong cement, so as to resist the utmost pressure of the water. The shield is then moved forward nine inches (the length of a brick), a fresh ring of brick-work is built, and a fresh portion of ground is excavated.

This curious anecdote led to another of the same nature—an ingenious contrivance borrowed from a lobster's tail. On the other side of the Clyde, opposite the city of Glasgow, there was abundance of fine water, which it was desirable to convey across the river for the use of the inhabitants, but so as not to interfere with the shipping, and not to be contaminated with the salt water. Mr. Watt, the celebrated engineer, undertook to carry it in iron pipes fitted one into the

other like the joints of a lobster's tail, so that when laid across the river they should adapt themselves to the form of the bottom. He perfectly succeeded; these flexible pipes have been in use for twenty years, and the inhabitants have been admirably supplied with this necessary of life, through that great man's happy power of observation.

17th.—My aunt has been very unwell for the last three days; she is now recovering, but still requires constant care. My cousins are most assiduous and tender nurses. They are attentive, without being officious, and they arrange the time of their attendance so as to permit each to have some leisure for her own daily occupations. This gratifies my aunt particularly; I have frequently heard her say, that it is a duty of those who attend on the sick to be as cheerful as possible, and that nothing contributes to cheerfulness so much as employment. She thinks it no proof whatever of real sensibility, to lay aside all one's usual pursuits because a friend or relation is ill; it only weakens the mind, and produces on the countenance that expression of anxiety which distresses or alarms the patient.

I do not know exactly what my aunt's illness has been—her eyes have been so much affected, that she has been condemned for some time to total idleness, and hitherto she has not been

permitted to listen to much reading or even conversation. I should have thought that a person who is so active in general, would have been doubly sensible of the weight of idle time. But her mind has such various stores of knowledge, deep and light, that she never can be in want of novelties to employ it; to-day I was allowed to stay with her for some time, and she repeated to me some beautiful moral reflections, as well as some lighter poetical compositions on which she had employed her mind last night. It is thus she beguiles the wakeful hours, and habituates herself to think more slightly of the sufferings which she sometimes endures.

END OF THE SECOND VOLUME.





